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# Executive Functioning of Kindergarteners as Predicted by Parenting Style, Parental Warmth, and Parents' Socioeconomic Status

Kimberly D. Barrow  
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# Walden University

College of Psychology and Community Services

This is to certify that the doctoral dissertation by

Kimberly D. Barrow

has been found to be complete and satisfactory in all respects,  
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the review committee have been made.

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Walden University  
2024

Abstract

Executive Functioning of Kindergarteners as Predicted by Parenting Style, Parental

Warmth, and Parents' Socioeconomic Status

by

Kimberly D. Barrow

MS, Walden University, 2017

MA, Gardner Webb University, 2015

BS, Cabrini University 1997

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Educational Psychology

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## Abstract

An academic achievement disparity exists between children from low-income and high-income households, and this gap progressively expands over time. A child's executive functioning skills and interactions with their parents can contribute to this deficit. This static group comparison and quantitative correlational research study was conducted to examine the effects of parental warmth, parenting style, and parents' socioeconomic status (SES) and the impact on kindergarten students' working memory and inhibition executive functioning skills. The research was guided by Bandura's social learning theory and Baumrind parenting style theory. The data sources were online self-reported surveys completed by parents with children in kindergarten. The following surveys were used for this study: parenting styles and dimensions questionnaire (short version), childhood executive functioning inventory, parental warmth questionnaire, and demographic questions. The sample included 118 participants. The results showed that the type of interactions a child had with their parents can impact their working memory and inhibition executive functions. Children with permissive or neglectful parents had a higher chance of having working memory and inhibition executive function deficits. The children who had positive relationships with their parents did not show these deficits. The findings from this study could have implications for positive social change by advocating for and implementing parenting programs aimed at enhancing parents' positive parenting abilities, as well as educational programs designed to intervene and improve executive functioning skills among students.

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## Dedication

I would like to dedicate this dissertation to my family. To my mother, Mary Barrow, my brother, Keith Barrow, and my uncle, Waymon Womble. Your unwavering love and support have consistently motivated, consoled, and influenced my development into the individual I am today. I am forever grateful to all of you. To my grandmother, Mamie Womble, the matriarch of our family who is no longer with us, thank you for your love that knew no bounds and for teaching me the value of hard work. Your spirit, strength, and guidance continue to live on through your family.

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## Chapter 1: Introduction to the Study

### **Introduction**

This study was conducted to examine parental warmth, seven dimensions of parenting styles, and parents' socioeconomic status (SES) in relation to kindergarten students' executive functioning, specifically working memory and inhibition. Social-emotional school readiness and academic success are facilitated by executive functioning skills (Mann et al., 2017). Understanding the significance of parental warmth, parenting style, and SES on executive functioning skills could lead to early interventions that enhance kindergarteners' school readiness and academic achievement.

In this chapter, I summarize the literature pertaining to the main variables of my study, from which I derive a specific research problem, study purpose, and research questions. I also provide an overview of the theories that inform my study, describe the research design and methodology, define key terms, identify assumptions essential to the study's significance, and discuss the study's scope and delimitations, limitations, and potential.

### **Background**

Executive functions are neurocognitive processes that help regulate behavior and emotions to help in achieving an objective or goal (Cortés Pascual et al., 2019). Working memory allows an individual to manipulate learned information temporarily, and inhibition helps control impulses (Cortés Pascual et al., 2019). Executive functioning skills are defined by Metaferia et al. (2021) as those that allow children to pay attention, plan, organize, remain on task, and regulate their emotions. Follmer and Sperling (2016)

stated that executive functioning can directly affect self-regulated learning, which is partially mediated by metacognition. Assessing and improving executive functions early in life is critical for school readiness and academic success (Diamond, 2016).

Previous research has shown that parenting style can significantly affect a child's physical, cognitive, emotional, and social development (Baumrind, 1991; Theresya et al., 2018). Parenting styles refer to the way parents raise their children and parent-child interactions. Parental involvement and strictness-supervision were combined to create Baumrind's (1967) four types of parenting styles: (a) authoritative, (b) authoritarian, (c) permissive, and (d) neglectful. Authoritative parents set clear expectations and rules and are responsive to their children's needs. Authoritarian parents have high expectations but low responsiveness, and there are strict rules and punishments for the child. Permissive parents do not attempt to discipline their children, lack structure, and have few restrictions. Neglectful parents are uninvolved and nonresponsive to their child's needs or desires. Parent-child interactions can influence a child's executive functions and self-regulated learning (Berthelsen et al., 2017). Pino-Pasternak and Whitebread (2010) concluded from an observational study that parental socioemotional behaviors of control, responsiveness, warmth, and affection may promote self-regulated learning in children.

Socioeconomically disadvantaged students typically score lower on standardized tests, perform poorly in school, and have lower educational attainment objectives than non-poor children do (Sharkins et al., 2017; Vortruba et al., 2016). The academic achievement disparity between children from low-income families and those from higher-

income families is evident as soon as they enter school and widens over time (Lawson & Farah, 2017; Votruba et al., 2016; Willoughby et al., 2017).

Differences in executive function abilities may account for socioeconomic gaps in academic performance. Low-income students who have attended Head Start or pre-kindergarten programs have better executive functioning skills in kindergarten than children who have never participated in school-based programs (Fuhs et al., 2015). These students do better academically because they can meet classroom demands by properly developing their executive functioning skills (Anthony & Ogg, 2020). Limited research has been conducted to examine how parental involvement, parental warmth, and SES impact a child's executive functioning skills (Ogg & Anthony, 2020). This study will hopefully aid educators in bridging the academic disparity between students from high-SES families and those from low-SES families and enable them to create programs that emphasize positive parenting skills.

### **Problem Statement**

Although the scholarly community has found (a) a disparity in academic performance between students from low-income versus high-income homes, (b) that academic performance is related to executive functioning, and (c) parental interactions influence executive functioning, the present study will add to the literature by examining the relative role of seven parenting dimensions: support and affection, regulation, autonomy, physical coercion, verbal hostility, punishment, and indulgence and parental warmth on kindergartens' executive functioning while controlling for SES. This study is unique because I focused on uncovering the role of actionable parenting variables on



kindergarten students' executive functions that may be masked by the relationship between poverty and executive functions (Sarsour et al., 2011; Ursache & Noble, 2016; Zelazo et al., 2016).

### **Purpose of the Study**

This quantitative research study was conducted to examine how parental warmth, seven dimensions of parenting style, and parents' SES affect the working memory and inhibition of executive functioning skills of kindergarten students.

### **Research Questions and Hypothesis**

RQ1: What is the combined effect ( $R^2$ ) of parental warmth, the seven dimensions of parenting style, and parents' SES in accounting for variance in kindergarteners' working memory executive function scores?

$H_01$ : Parental warmth, the seven dimensions of parenting style, and a parents' SES do not account for variance ( $R^2$ ) in working memory executive function scores at alpha = .05.

$H_{a1}$ : Parental warmth, the seven dimensions of parenting style, and the parents' SES do account for variance ( $R^2$ ) in working memory executive function scores at alpha = .05.

RQ2: What are the relative effects squared semi-partial correlation and relative weight of parental warmth, the seven dimensions of parenting style, and parents' SES in accounting for variance in working memory executive function scores?

There is no statistical test yielding a probability value for comparing the squared semi-partial correlation or relative weight of predictors, so hypotheses cannot be tested

and are therefore not applicable. The squared semi-partial correlation ( $sr^2$ ) is the amount of variance in the outcome variable that is uniquely accounted for by a predictor and is interpreted in rank order fashion (Tabachnick & Fidell, 2007). Johnson's  $\epsilon$  corrects for intercorrelations among predictors (Johnson, 2000; Lorenzo-Seva et al., 2010), yielding relative weights for each predictor that sums to 1, allowing interpretations disentangled from predictor correlations and has been shown superior to other relative importance indicators (Johnson & LeBreton, 2004).

RQ3: What is the combined effect ( $R^2$ ) of parental warmth, parenting style, and parents' SES in accounting for variance in kindergarteners' inhibition executive function scores?

$H_{03}$ : Parental warmth, the seven dimensions of parenting style, and the parents' SES do not account for variance ( $R^2$ ) in inhibition executive function scores at  $\alpha = .05$ .

$H_{a3}$ : Parental warmth, the seven dimensions of parenting style, and the parents' SES do account for variance ( $R^2$ ) in inhibition executive function scores at  $\alpha = .05$ .

RQ4: What are the relative effects squared semi-partial correlation and relative weight of parental warmth, the seven dimensions of parenting style, and parents' SES in account for variance in inhibition executive function scores?

As detailed for RQ2, hypotheses are not possible for RQ4.

RQ5: To what extent do parental warmth, the seven dimensions of parenting style, and parents' SES differentially account for variance in working memory versus inhibition executive function scores?

*H<sub>0</sub>5*: The variance accounted for by the common set of predictors in working memory is not statistically significantly different than the variance accounted for in inhibition executive function scores.

*H<sub>a</sub>5*: The variance accounted for by the common set of predictors in working memory is statistically significantly different than the variance accounted for in inhibition executive functions scores.

RQ6 (exploratory): To what extent do scores on parental warmth, the seven dimensions of parenting style, working memory, and inhibition differ by self-rated SES?

Because RQ6 is exploratory only, hypotheses are not warranted.

As operationalized in detail in Chapter 3, Boel-Studt and Renner's (2013a) parental warmth measure, Robinson et al.'s (2001) parenting styles and dimensions questionnaire (PSDQ), Thorell and Nyberg's (2008b) childhood executive functioning inventory (CHEXI), and an item I specifically developed to report SES were used to measure the key study variables. Ordinary least squares regression was used to answer RQ1–RQ4, along with the rank ordered  $sr^2$  and Johnson's  $\epsilon$  to answer RQ 2 and RQ4, RQ5 will be answered using Williams's *T* statistic (Steiger, 1980), and a series of one-way ANOVAs will answer RQ6.

## **Theoretical Framework**

The theoretical framework for this research study includes Bandura's social learning theory and Baumrind's theory of parenting style. Bandura's (1969) theory considers the interaction between one's environment and cognitive factors and their effects on learning and behavior. Baumrind's (1967) theory is well-known in research for addressing authoritative, authoritarian, and permissive parenting styles.

### **Bandura's Social Learning Theory**

According to Bandura's social learning theory, children learn by observing their environment and people (Bandura, 1969; Wulfert, 2019). Bandura's theory aligns with executive functions because both state that children are not born with these skills. Children develop their executive functioning skills over time based on their relationships with adults and the conditions of their environment (Blankson et al., 2011). SES and parents' education determine the types of resources parents can provide their children, which can positively or negatively impact the development of their executive function skills. Parents with high SES provide their children with resources such as food, security, stable housing, and opportunities to travel and visit libraries and museums (Conway et al., 2018). High-income parents have higher educational levels and more positive interactions with their children, increasing executive function development and creating an academic advantage for these children (Conway et al., 2018). However, children living in low-income households may lack these resources, and their family environment may expose them to multiple stressors, organizational chaos, crowding, excessive background noise, and a lack of structure and routine (Conway et al., 2018). Parents with low SES

may be less educated, negatively impacting their children's executive functioning skills and education development. Economically disadvantaged children may perform more poorly on cognitive tasks than those children not faced with these adversities, which could lead to academic deficits. Therefore, it is essential to implement programs to help economically disadvantaged children with their executive function skills.

### **Baumrind's Theory of Parenting Style**

Baumrind (1967) believed there are four characteristics of effective parenting: nurturing, communication, maturity demands, and control. From these characteristics emerge the four parenting styles (a) authoritative, (b) authoritarian, (c) permissive, and (d) neglectful (Sorkhabi & Mandara, 2013). Authoritative parents are supportive and nurturing and set reasonable boundaries for their children, allowing them to feel empowered and make sound decisions and choices. According to Baumrind (1967), the authoritative parenting style is the most effective because of the high demandingness and high responsiveness. Authoritarian parents are controlling, unresponsive, and have high expectations for their children (Baumrind, 1978). Children whose parents used an authoritarian parenting style may become rebellious and dependent, display aggressive behaviors, and have low self-esteem. Permissive parents are warm but do not place any demands on their children (Baumrind, 1967). These parents do not want to disappoint their children and rarely say no, and the children have no boundaries or rules and often have difficulty with peer relationships (Baumrind, 1967). Neglectful parents are uninvolved and unresponsive to their child's needs or desires.

### **Nature of the Study**

This research was a quantitative correlational and static group comparison study (see Campbell & Stanley, 1963). As a correlational study, the primary purpose of this study was to examine the combined ( $R^2$ ) and relative ( $sr^2$ , Johnson's  $\epsilon$ ) contributions of the independent variables of parental warmth, seven dimensions of parenting style, and SES in accounting for variance in the dependent variables of parents' ratings of two separate dimensions of their children's executive functioning (working memory and inhibition). A correlational ordinary least squares design allows for the simultaneous assessment of multiple intercorrelated predictors in accounting for variance in a dependent variable and aligns with the primary purpose of my research. Secondly, as a static group comparison design, I examined SES to determine group differences on parental warmth, each of the seven parenting style dimensions, and the two executive function subscale scores.

Members of Centiment's audience panel (Centiment, n.d.a.) who are a parent of kindergarten students in the United States were invited to participate. The methodology is detailed in Chapter 3. An ordinary least squares regression analysis was used to examine the relationship between the predictor variables and the two outcome variables.

Additionally, one-way ANOVAs was used to examine SES group differences in parental warmth, the seven PSDQ subscales, and the two executive function scales. I used IBM SPSS Version 27.0 for all analyses.

## Definitions

*Authoritarian:* A parenting style in which parents offer low emotional support and place high demands on their child. The parents focus on obedience, discipline, and control and lack nurture (Baumrind, 1991).

*Authoritative:* A parenting style in which parents are nurturing, responsive, and supportive. Parents set limitations by creating rules, setting boundaries, and listening to their child's point of view but not always accepting what the child says (Baumrind, 1991).

*Childhood executive functioning inventory (CHEXI):* CHEXI is a rating instrument that parents and teachers use to measure executive functions in children ages 4–12. Twenty-six items on the CHEXI yield two subscales' scores: working memory and inhibition (Camerota et al., 2018; Thorell & Nyberg, 2008b).

*Cognitive flexibility:* Also referred to as *attention switching*, allows one to switch from one mindset to another and shift their thinking based on the changing situation (Metaferia et al., 2021).

*Executive function:* A set of cognitive processes that work together to help plan, focus, remember instructions, and manage multiple tasks (Metaferia et al., 2021).

*Inhibitory control:* Allows one to control their impulses and behavioral responses to stimuli that can impede their goals (Memisevic & Biscevic, 2018).

*Parental warmth:* The behavior a parent shows their child, such as affection, concern, nurturance, and support. Parental warmth indicates a parent's love and acceptance for their child or the lack thereof.

*Parenting style:* Four parenting styles are authoritarian, authoritative, permissive, and uninvolved. Parenting styles vary based on a parent's upbringing, affecting their child's behavior and academic achievement (Kashahu et al., 2014).

*Permissive:* A parenting style also known as *indulgent* parenting. Permissive parents have high responsiveness and low demands on their children. They are very responsive to the needs of their children but do not set limits and are inconsistent with rules and enforcing boundaries (Baumrind, 1991).

*Socioeconomic status (SES):* A combination of education, income, and occupation.

*Working memory:* Allows an individual to take the information learned, add to it, store it, and manipulate it (Metaferia et al., 2021).

### **Assumptions**

In this study, I assumed that the self-reported scores from parents about their child's executive function skills, parenting styles, parental warmth, and SES would be truthfully reported. I also assumed the participants from Centiment's audience panel would truthfully answer the eligibility criteria of being a parent of a kindergarten student in the United States. Pertinent to interpreting the results, I assumed that parents of kindergarten students would want their children to succeed in school.

### **Scope and Delimitations**

This study was conducted to identify associations between parental warmth, parenting style, and parents' SES and its possible effects on a child's working memory and inhibition of executive functioning skills. Prior research has examined parental



warmth in relation to academic achievement, focusing on math and literacy skills, but studies examining how parental involvement, warmth, and SES impact a child's academics are limited (Ogg & Anthony, 2020). Even though many studies have similar variables, they have not focused on kindergarten students' working memory and inhibition of executive function skills. The results of this study could potentially help researchers and educators develop programs and implement strategies to help improve kindergarten students' executive function skills, which could positively impact their academic achievement. The participants in this study were parents who have children in kindergarten.

### **Limitations**

The limitations of this study include being a nonexperimental self-report, limiting internal validity and interpretations of cause-and-effect relationships between parenting interactions and a child's executive functioning. External validity is threatened by potential voluntary selection bias, resulting in variable responses that may differ from the general population (see Campbell & Stanley, 1963). Obtaining an insufficient number of parents to complete the surveys, which could limit the amount of data collected, is one of the challenges and obstacles that could have arisen in this study.

### **Significance**

Children's executive functioning skills develop over time based on exposure to their environment and parental relationships (Ready & Reid, 2019). SES can also impact the development of a child's executive functions. Children from lower-income families often have executive function deficits (Kao et al., 2018). Some contributing factors are

exposure to violence, crime, housing/family instability, and household disorganization (Kao et al., 2018). Higher-income families can provide their children with the resources they need to help with their development, such as stability in the home, learning materials, educational activities both inside and outside the home, and parental support (Kao et al., 2018). Several parenting practices can affect a child's academic development, such as parents' values and beliefs, educational aspirations, parent involvement, parenting styles, and family environment (Wang et al., 2021).

Previous research has shown parenting styles' impact on students' academic achievement (Theresya et al., 2018; Wang et al., 2021). Most of the research that has examined parenting styles suggests the authoritative parenting style is ideal for positive academic and social-emotional outcomes in Western cultures (Wang et al., 2021). In Eastern cultures, where authoritarian parenting is more prevalent, there is no distinction between authoritarian and authoritative parenting in terms of the academic and social-emotional goals of a child (Wang et al., 2021). This research could be helpful to the educational system by increasing educators' knowledge about the relationships between parenting styles and academic achievement and helping in the development of programs to help parents with parenting skills.

### **Summary**

This chapter discusses the problem concerning parenting styles and SES and their impact on the executive function of kindergarten students. Other areas included the purpose of the study, theoretical framework, definitions, assumptions, scope and delimitations, limitations, and the significance of the study. Chapter 2 is the literature

review constructed around the research questions. Chapter 2 details executive functions, parental warmth, parenting styles, and SES. Chapter 3 is about the research design and rationale and includes the methodology, which entails the population, sampling size, instruments used for collecting data, and any threats to validity. The data are analyzed and presented in Chapter 4. Chapter 5 consists of the summary, findings, recommendations, and conclusions.

## Chapter 2: Literature Review

### **Introduction**

Economically disadvantaged kindergarteners often score lower on standardized tests and do more poorly in school than children who are not economically disadvantaged (Hair et al., 2015; Votruba et al., 2016). This study explored the executive functioning skills of economically disadvantaged kindergarteners and their relationships with their parents based on parenting style. This quantitative research study addresses a gap in existing literature related to the academic disparities between economically disadvantaged kindergarten students and non-economically disadvantaged kindergarten students. The findings of this study will help to better understand how to address these inequalities and improve students' executive functions. Executive function skills are critical for a child's healthy cognitive, social, and psychological functioning. These skills are essential to good school/academic outcomes and success in social interactions (Jones et al., 2015).

There are academic achievement gaps between children from different socioeconomic groups when they enter school, which increase over time (Lawson & Farah, 2017; Votruba et al., 2016; Willoughby et al., 2017). In educational psychology, researchers agree that executive functioning skills improve students' academic achievement (Diamond, 2016). Low-income students who have attended Head Start or pre-kindergarten programs have better executive functioning skills in kindergarten than children who have never participated in school-based program (Fuhs et al., 2015). Students who have attended an early education program perform better academically

because their executive functioning skills have been sufficiently developed to meet classroom demands (Nesbitt et al., 2013).

The literature review examines the early development of executive functions related to children's academics, behaviors, and SES. Executive functioning skills, as defined by Ursache and Noble (2016), allow children to pay attention, plan, organize their thoughts, stay focused, and control their emotions. Executive functioning skills develop over time based on children's exposure to their environment and their relationships with adults (Hair et al., 2015; Sasser et al., 2017). Executive function skills are critical because they help kindergarten students learn and socially interact with their peers. Executive function skills are steppingstones for developing cognitive and social capacities and help complete everyday tasks (Fuhs et al., 2015). Executive function skills are critical because they help with learning and social interactions with others (Blair, 2016). Completing everyday tasks requires excellent executive functioning skills (Fuhs, 2015).

Academic achievement inequalities exist between low-income children and children from higher-income families when the children first start school. This gap increases over time (Lawson & Farah, 2017; Votruba et al., 2016; Willoughby et al., 2017). Within educational psychology, researchers agree that using executive functioning skills improve students' academic achievements (Diamond, 2016). Low-income students who have attended Head Start or pre-kindergarten programs have better executive functioning skills in kindergarten than children who have never participated in school-based programs (Fuhs et al., 2015). Students exposed to an early education program have

developed the executive function skills needed to meet their classroom needs (Fuhs et al., 2015). Therefore, this quantitative research study is needed to address the gap in understanding the inequalities in executive functions and SES and their impact on kindergarten students' academics. The findings of this study help to better understand how to address these inequalities and improve students' executive functions.

### **Literature Search Strategy**

While searching for articles for this literature review, I focused on several key terms: *kindergarten, early childhood, early childhood education, education, executive function skills, parent, family or caregiver, parenting style, parental warmth, socioeconomic status, and working memory*. The databases I used to search for peer-reviewed articles came from Walden University's library databases, including Education Source, Academic Search Complete, ERIC, SAGE Journals, ProQuest, and PsycINFO. In addition, I used Google Scholar as a research resource. The literature search focused on peer-reviewed articles published within the last 5 years.

I organized the literature review into sections to gauge the significance of executive functioning skills and kindergarten and academic achievements among economically disadvantaged students. I synthesized literature published on the theoretical frameworks of Bandura's (1969) social learning theory and Baumrind's theory of parenting style and themes including executive function, working memory, cognitive flexibility, inhibitory control, deficits in executive functions, SES, executive functions, and parenting and executive functions. This chapter concludes with a summary.

## Theoretical Framework

Bandura's social learning theory was one of the theoretical foundations employed in this research study. According to Bandura's social learning theory, children learn by watching other people and their surroundings (Cohen, 1992; Miller et al., 2018). Bandura's theory aligns with executive functions because children are not born with these skills. The skills are developed over time based on relationships with adults and conditions of one's environment (Blankson et al., 2011). SES and parent education determine the types of resources parents can provide their children, which can positively or negatively impact the development of their executive function skills. Parents with high SES provide their children with resources such as food, security, stable housing, and opportunities to travel and visit libraries and museums (Conway et al., 2018). High-income parents have higher educational levels and more positive interactions with their children, increasing executive function development and creating an academic advantage for these children. Children living in low-income households may lack these resources, and their family environment may expose them to multiple stressors, organizational chaos, crowding, excessive background noise, and a lack of structure and routine (Conway et al., 2018). Low SES parents may be less educated, which can negatively impact their children's executive functions and educational developments. Economically disadvantaged children may perform more poorly on cognitive tasks than those children not faced with these adversities, which could lead to academic deficits. Therefore, it is essential to implement programs to help children from low-income homes with their executive function skills.

This study also used Baumrind's (1967) parenting style as the second theory. According to Baumrind, for parents to be effective, they must nurture their children, communicate, place reasonable demands on them, and set boundaries. The type of behavior a parent exhibits to their child determines the type of parenting style. Three parenting styles are authoritative, authoritarian, and permissive (Sorkhabi & Mandara, 2013). Authoritative parents support, nurture, enforce rules, and explain to their children why they need rules (Baumrind, 1967). Authoritarian parents are strict and do not take the child's perspective into account. Permissive parents allow their children to make their own decisions and rarely have rules or receive punishment (Baumrind, 1967).

## **Literature Review**

### **Executive Functions**

Executive functioning skills develop over time as a result of a child's exposure to the environment and interactions with adults (Hair et al., 2015; Sasser et al., 2017). The three core executive function skills are working memory, inhibition, and cognitive flexibility (Hair et al., 2015; Sasser et al., 2017). These mental processes work together when goal-directed to prompt higher-order thinking, such as reasoning, problem solving, and planning (Blair, 2016; Sasser et al., 2017). People need executive function skills to manage their emotions, succeed in school and in life, and to develop their social, psychological, and cognitive abilities (Blair, 2016; Diamond, 2016).

The brain's frontal lobe area controls executive functions. Children from low-income families develop deficits in their executive functioning skills more frequently than children who live in higher socioeconomic groups (Ursache & Noble, 2016). This



part of the brain is responsible for social–emotional processing, memory, language, self-regulation, and problem solving. Ursache and Noble (2016) found structural variations in the frontal lobe, temporal lobe, and hippocampus in low-income children compared to higher-income children. These abilities enable people to pay attention, plan ahead, undertake projects, stay committed to them, control their emotions, monitor their actions, and stay organized (Ursache & Noble, 2016). Executive function skills are set cognitive abilities that children develop over time based on their relationships with adults and their environment (Ackerman & Friedman, 2017; Blankson et al., 2011). Executive function skills are generally defined as the cognitive abilities that consciously support goal-directed behavior (Blankson et al., 2011). Children from low-income families who are neglected, abused, or exposed to violence may endure brain damage that prevents the healthy growth of their executive functioning abilities (Hair et al., 2015).

### **Cultural Contributions to Executive Functions Development**

A child's early experiences from parenting, attachment, and home environment can strongly influence the development of their executive functions (Bernier et al., 2012). Vygotsky (1978) conducted some of the earliest executive functions studies, which explored the impacts of familial context, and concluded that executive functions are connected to neuropsychological skill development. Limited studies have examined how executive functions are affected by family diversity and cultural identities (Roos et al., 2017). Veer et al. (2017) conducted a study on cultural experiences and learning multiple languages, and their effects on developing a child's executive functions. The results showed that culture impacts behavioral regulation/response inhibition (Veer et al., 2017).

When looking at parenting styles and practices, they are different for each cultural group or individual. Positive parental control plays a crucial role in developing a child's self-regulation.

### **Working Memory**

Working memory comprises several components: the central executive, visuospatial sketchpad, phonological loop, and episodic buffer. These components are stated in Baddeley and Hitch's (1974) working memory model, the most influential of all models today (as cited in Funahashi, 2017). According to Baddeley and Hitch, the central executive system's main component of working memory has two dependent components: the phonological loop and the visuospatial sketchpad. The episodic buffer was added later (Funahashi, 2017). The phonological loop aims to deal with spoken and written material and is divided into two subcomponents. The first subcomponent is the phonological store or inner ear. This subcomponent temporarily stores information that is heard for a few short seconds. The second subcomponent is articulatory process control or outer voice processes speech production, allowing individuals to repeat verbal information in a loop (Miller, 2018). The repeated information here is stored and can be recalled for later use.

Working memory is critical because it allows an individual to take learned information, add to it, store it, and manipulate the information for a while (Diamond, 2016). This is important for understanding how things unfold over time, such as what happened first, next, and last (Diamond, 2016). An example of working memory is when someone remembers a telephone number or address while looking for a paper to write down the information. An example of working memory in the classroom is mentally

solving an arithmetic problem given by teacher without using a calculator or writing it down.

The visuospatial sketchpad manages visual and spatial information and temporarily stores information about how things look, manipulating those images in the mind (Buttelmann et al., 2019). The purpose of the episodic buffer is to integrate information from a variety of sources (phonological loop, visual sketchpad, time, order) and chunk or put it into episodes to store in a long-term memory system (Buttelmann et al., 2019). An example of a visuospatial sketchpad is drawing a picture of a tree. The visuospatial sketchpad holds the picture of the tree in one's mind while they draw it on paper. Because images in the mental sketchpad are held for a short time, an individual will need to keep looking back at the tree's original picture to complete the drawing or retrieve the image from their long-term memory. Children with working memory deficits struggle to process information and manage classroom demands, which can impair their problem solving and higher-order thinking (Morgan et al., 2019). Some examples of working memory deficits are students' difficulty understanding the text they read, following multi-step directions, and using problem-solving strategies.

### **Cognitive Flexibility**

Cognitive flexibility, or attention switching, is a person's ability to mentally switch from one task to another or shift between multiple tasks simultaneously (Buttelmann & Karbach, 2017). Like working memory and inhibitory control, cognitive flexibility develops during a child's first year but rapidly develops during their preschool years. Children who are flexible thinkers can unlearn the old way of doing something and

switch to learning how to do it a new way. An example of flexible thinking is children learning how to tie their shoes. First, they may use the bunny ears method to make each lace a loop. Then they learn the squirrel in a tree method, making one loop and wrapping the other lace around it to tie their shoes. When children go from the primary way to tie their shoes to the more advanced form, they use flexible thinking, which means they are unlearning the old way and shifting to the new way of learning (Buttelmann & Karbach, 2017).

Research has shown that economically disadvantaged people have lower cognitive functions, including language development and overall language ability, memory, and visuospatial ability (Lawson et al., 2016). Cognitive flexibility deficits reduce children's ability to transfer their attention across learning tasks, thereby hindering their problem-solving skills (Morgan et al., 2019). In addition to children having cognitive disabilities affecting executive functions, behavioral disabilities can also play a role in developing executive functions.

### **Inhibitory Control**

Inhibitory control delays some initial responses while attempting to complete a task (Morgan et al., 2019). Inhibitory control enables individuals to control their impulses and behavioral responses to external stimuli, which can impede their goals (Memisevic & Biscevic, 2018). Inhibitory control develops in late infancy and continues throughout the preschool years. By age five, one can see a significant improvement in a child's inhibitory control because they can focus and ignore external stimuli and have better self-control (Memisevic & Biscevic, 2018). In the classroom, inhibitory control allows the

child to follow the teacher's directions even if the classroom is noisy. Inhibitory control deficits can interfere with a child's ability to ignore or disregard irrelevant information while participating in classroom activities and disruptive or impulsive behaviors (Morgan et al., 2019).

### **Deficits in Executive Function**

Executive functioning skills and behavioral regulation are predictors of academic achievement for young children. Children with executive function deficits struggle in the classroom. Early deficits in children's executive function skills from low-income families can impact their academic achievement (Sasser et al., 2017). There are other risk factors these children face, such as lack of parental academic involvement, negative attitudes towards school, neighborhood economic hardship, authoritative parents, a family experiencing financial hardship, and lower maternal education and family background (Banerjee, 2016). Children who exhibit executive function issues in preschool will act aggressively instead of expressing their feelings and frustrations. They can start one task in elementary school, get distracted, and never complete their original work. Children in middle school could have difficulty beginning a big assignment and focusing on less important details first. High school students have trouble finishing a short-answer test in the allotted time.

Prekindergarten-aged children are at a crucial developmental stage because they are just beginning to learn academic concepts and their executive functioning skills are developing and improving (Fuhs et al., 2015). Executive function skills are acquired; prekindergarten-aged children are provided with interventions to promote the

development of these skills. Additionally, it will improve their academic performance and reduce their hyperactivity and disruptive behaviors. As adolescents or adults, they are less likely to commit crimes and engage in delinquent behavior (Fuhs et al., 2015).

### **Socioeconomic Status and Executive Function**

Several factors can impact the development of a child's executive functions. These factors are: SES, race/ethnicity, education, employment, parenting styles, parental involvement, and parents' expectations for their children. A child in a low socioeconomic family does not happen by choice. Children under the age of six are more vulnerable to living in poverty than those in other age groups. Forty-five percent of children six and under come from low-income families, and 23 percent live in low-income families (Jiang et al., 2017).

Parenting styles vary according to SES, affecting a child's behavior and academic achievement (Kashahu et al., 2014; Nowak et al., 2020). Most children from higher socioeconomic groups have highly educated parents, thus increasing their academic achievement (Kashahu et al., 2014; Nowak et al., 2020). Parents from this socioeconomic class better understand the importance of providing their children with enriching learning opportunities (Puccioni, 2014).

According to Ursache and Noble (2016), a child's SES can have a negative impact on their language, memory, executive function, and social-emotional processing during brain development. Stressful environments have a negative impact on the executive functioning and behavioral regulation of low-income children (Duncan et al., 2017). According to studies, children living in poverty experience greater levels of

chronic stress, which can lead to difficulties with executive functions and the brain's regulatory system. In addition to SES impacting executive functions, studies have shown that executive functions can also be affected by one's minority status (Nesbitt et al., 2013).

### **Parenting and Executive Functions**

Parents or primary caregivers are likely the first sources of support that a child receives. During a child's early and middle childhood development, they create strong bonds with their parents, which is also when executive functions continue to develop (Sosic-Vasic et al., 2017). According to Bernier et al., 2012 (as cited in Sosic-Vasic et al., 2017), children between the ages of one to three perform better on working memory and cognitive flexibility tasks when they have supportive parents. On the other hand, children with unsupportive parents often have executive function deficits and cope with childhood stress.

Parental behaviors can be grouped into socioemotional and instructional categories (Pino-Pasternak & Whitebread, 2010). Socioemotional behaviors are parental warmth, responsiveness, and control. Supportive parents show affection and encourage their children to show parental warmth (Gurdal et al., 2016). Parental warmth helps with childhood adjustment and overall well-being until young adulthood and is also associated with better inhibitory control skills (Gurdal et al., 2016). Children who have neglectful unresponsive parents have adverse outcomes in their development. This impacts early childhood, but it can have lasting effects that are seen later in life.

Parents who exhibit high parental warmth levels have better coping skills when faced with stressful life events, increasing their creative potential (Wang & Dong, 2019). Children who use problem-focused coping strategies do so because of parental warmth and affection they receive from their parents. They continue using these strategies in adolescence and adulthood (Moran et al., 2018). Children who received little to no attention from parents used emotion as a coping strategy (Moran et al., 2018).

Parental beliefs can guide the parenting practices they use with their children, affecting the quality of parent-child interactions and the development of a child's executive functioning skills. Parents who attempt to control their child's behavior, influence their child's decisions, or use harsh discipline to reprimand their child are considered controlling parents. Responsive parents tend to their children's needs and feelings promptly.

### **Brain Plasticity and Poverty**

Poverty can affect a child's neuroendocrine function, early brain development, cognitive ability, and executive functions (Haft & Hoeft, 2017). The majority of the world's population is made up of children born or raised in low-income families. Children in economically disadvantaged environments risk developing poor executive functioning skills (Haft & Hoeft, 2017). Research studies have shown that children from higher socioeconomic groups have better executive functions in all areas of working memory, cognitive flexibility, and inhibitory control (Noble et al., 2015). Recently studies have found cultural influences impacted language abilities and the executive functions areas of working memory and cognitive flexibility. Being able to understand



how executive functions develop and being able to support their developments will allow more opportunities to provide effective interventions.

### **Summary and Conclusions**

This chapter addresses this study's problem and brings awareness to the inequalities and gaps in kindergarten students' academics from economically disadvantaged communities. When there is a lack of parental involvement or families experiencing economic hardships and cannot provide their children with the primary resources needed to survive, there is a deficit in the child's executive function. To help close these academic gaps and help with a child's executive function skills, interventions must be implemented in schools and resources to help parents positively interact with their children.

The theories used in this study are Bandura's Social Learning and Baumrind's Parenting Style. Bandura brings awareness to children's different developmental stages and how they learn from their environments. While Baumrind looks at three parenting styles, authoritative, authoritarian, and permissive, and how they can affect a child's development. In accordance with these professional findings, it is crucial to ensure that children have the resources they need to help them develop the appropriate skills they need to grow and succeed academically.

The PSDQ, a Likert-type survey that measures the three parenting styles (authoritative, authoritarian, and permissive), then groups them into three subscales (reasoning/induction, warmth and support, and autonomy granting) to address academic deficits and deficiencies in executive functioning skills among kindergarten students. The

CHEXI is a Likert-type scale that parents use to assess their kindergarten child's working memory and inhibition-based executive function skills. The five-item parental warmth scale will be used to assess the nature of parental relationships with children. The SES of parents will be determined by their level of education, income, and occupational status. To help generalize the sample, I will also consider demographic information, such as the sex, age (in years), race/ethnicity, greatest level of education, and household income category of each participant.

## Chapter 3: Research Method

### **Introduction**

The primary purpose of this quantitative study was to determine the combined and relative effects of the independent variables parental warmth, seven dimensions of parenting style, and parents' SES in separately accounting for variance in two domains of executive functioning (working memory and inhibition and dependent variables) of kindergarten students as rated by parents. A secondary purpose was to determine the extent of difference in parental warmth, the seven dimensions of parenting style, and the two domains of executive functioning by parents' self-reported SES. In this chapter, I explain the rationale for the research and the purpose of this study. In addition, I discuss the population, sampling and sampling procedure, recruitment and participation procedures, and data collection. In addition, I review the instrumentation and operationalization of constructs, the data analysis plan, validity threats, and ethical procedures in this chapter.

### **Research Design and Rationale**

This study included quantitative correlational and static group comparisons (see Campbell & Stanley, 1963). As a correlational study, the primary purpose of this study was to examine the combined ( $R^2$ ) and relative ( $sr^2$ , Johnson's  $\epsilon$ ) contributions of the independent variables of parental warmth (Boel-Studt & Renner, 2013a), seven dimensions of parenting style (Robinson et al., 2001), and SES in accounting for variance in the dependent variables of parents' ratings of two separate dimensions of their child's executive functioning, working memory and inhibition (Thorell & Nyberg, 2008b).

A correlational ordinary least squares design allows for the simultaneous assessment of multiple intercorrelated predictors in accounting for variance in a dependent variable and aligned with the primary purpose of my research. Secondly, as a static-group-comparison design, I also examined SES to determine group differences on parental warmth, each of the seven parenting style dimensions, and the two executive function subscale scores. This static group comparison design aspect is appropriate because it allows, through group mean differences, the examination of the effect of a categorical independent variable on a metrically measured dependent variable (Cook & Campbell, 1979).

Multiple linear regression can advance knowledge in the field because it recognizes multiple correlated influences on a dependent variable and can answer questions about theoretical expectations when the independent variables represent a theoretical set or competing sets (Cohen et al., 2013). Moreover, multiple linear regression advances knowledge because both the combined and relative effects of the predictors can be determined (Cohen et al., 2013). Similarly, the role of the static group comparison in the series of one-way ANOVAs to examine differences across the study variables by SES can advance knowledge by determining which study variables SES is most impactful.

## **Methodology**

### **Population**

Researchers conduct their studies by investigating populations, which can be people, items, or events in a group (Frankfort-Nachmias & Nachmias, 2008; Warner,

2013). The research question or the purpose of the study will help determine the targeted population for a study (Frankfort-Nachmias & Nachmias, 2008; Warner, 2013). The population for this study was parents of kindergarten students in the United States.

According to the National Center for Education Statistics (NCES, 2012), 36 million children attended kindergarten in U.S. public schools. There is no readily available information for family characteristics specifically broken out for kindergarten only, so I assumed characteristics of families with school-age children would be similar. More than half (54.0%) of children under the age of 18 have parents with less than a 4-year college degree as their greatest level of education (NCES, 2012). Of children under age 18, 71% lived in a two-parent household, 23.0% in a female parent only household, and 5.0% in a male parent only household (NCES, 2012). And 16% of children under age 18 lived in poverty as defined by the U.S. Census Bureau's family size and composition guidelines (NCES, 2012).

### ***Sampling and Sampling Procedures***

A researcher may not be able to study the entire population, so sampling elements of the population is done to represent the whole (Fereshteh et al., 2017). For this research study, purposive sampling was used. "Purposive sampling is a nonprobability sampling procedure in which elements are selected from the target population based on its fit with the purposes of the study and specific inclusion and exclusion criteria" (Daniel, 2012, p. 87). Participation is open to parents whose kindergarten children attend a public school in the United States and who are registered members of Centiment's (n.d.a) audience panel.

### ***Power Analysis for Target Sample Size***

The target sample size is based on the statistical analyses of a study (Cohen, 1992). Multiple linear regressions and independent  $t$ -tests will answer the research questions. In a multiple linear regression with  $\alpha = .05$  and power = .80, a sample of 128 is sufficient to detect a population effect of an individual predictor of  $sr^2 = .059$  (a medium-size effect; Cohen, 1988) within a set of nine predictors (Faul et al., 2009; see Appendix A). A sample of 128 is also sufficient to detect a between-groups population effect size of partial  $\eta^2 = .059$  (a medium-size effect; Cohen, 1988) at  $\alpha = .05$  and power = .80 (see Appendix A).

### **Procedures for Recruitment, Participation, and Data Collection**

Centiment was provided with an invitation to participate (Appendix E) that was then sent out to eligible participants within Centiment's audience panel. The invitation included a link to a survey created using Centiment's (n.d.b) survey tool and hosted online by Centiment. The first page of the online survey contained the informed consent form that participants tacitly acknowledged by advancing to the next page. Centiment collected data, and the data were comprised of individual participant responses to the 24 CHEXI items, 32 PSDQ items, five parental warmth items, and five demographic items (sex, age, race/ethnicity, level of education, and household income bracket). Participants could exit the survey at any time and would automatically exit the survey upon completion. Debriefing and follow-up procedures are not relevant to my study. Data were exported from Centiment to IBM SPSS for analysis.

## **Instrumentation and Operationalization of Constructs**

### ***Parenting Styles and Dimensions Questionnaire***

The PSDQ-short (Robinson et al., 2001) is a 32-item self-reported instrument based on Robinson et al.'s (2001) original 62-item version. The PSDQ-short measures three dimensions of parenting styles: (a) authoritative (15 items grouped into three subscales: reasoning/induction, warmth and support, and autonomy granting); (b) authoritarian (12 items grouped into three subscales: non-reasoning, physical coercion, and verbal hostility); and (c) permissive (five items). On a five-point Likert-type scale ranging from 1 (*never*) to 5 (*always*) participants respond to each item.

Robinson et al. (2001) established the seven dimensions using structural equation modeling of responses from 1,377 participants. The three items are warmth and support, reasoning/induction, and autonomy-granting dimensions. Example items, in respective order, are the following: "I am responsive to our child's feelings or needs," "I explain to our child why rules should be followed," and "I allow him or her to provide input into family rules." Based on the standardized factor coefficients in the structural equation solution for mothers' self-report (Robinson et al., 2001), I calculated composite reliability (Geldhof et al., 2014) for warmth and support, reasoning/induction, and autonomy granting as .79, .80, and .62, respectively. The physical coercion, verbal hostility, and non-reasoning dimensions are each made up of four items. For example, in respective order: "I use physical punishment to discipline our child," "I yell or shout when our child misbehaves," and "I punish by taking privileges away from our children with little if any explanations." Composite reliability based on Robinson et al.'s (2001) standardized

factor coefficients for physical coercion, verbal hostility, and non-reasoning are .79, .61, and .62, respectively. The permissive dimension is made up of five items, one of which is: “I find it difficult to discipline our child.” Robinson et al. (2001) reported Cronbach’s alpha of .64, and the composite reliability based on their reported factor coefficients is .67.

Mean composite scores ranging from 1 to 5 were computed for each of the seven PSDQ dimensions. None of the items require reverse coding prior to computing the composite score. The specific PSDQ items that make up each dimension are the following: (a) warmth and support (1, 7, 12, 14, 27); (b) reasoning/induction (5, 11, 25, 29, 31); (c) autonomy granting (3, 9, 18, 21, 22); (d) physical coercion (2, 6, 19, 32); (e) verbal hostility (13, 16, 23, 30); (f) non-reasoning (4, 10, 26, 28); and (g) permissiveness (8, 15, 17, 20, 24). Higher scores indicate a higher frequency of engagement in the underlying construct, such as higher autonomy granting, higher physical coercion, and higher permissiveness. Permission was gained from the developer to use this instrument, and a copy of the permission letter is in Appendix B.

### ***Childhood Executive Functioning Inventory***

The CHEXI was developed in 2008 by Thorell and Nyberg and was used to measure the parent-reported executive function of kindergarteners. CHEXI is a rating instrument that parents and teachers use to measure executive functions in children ages 4–12. Respondents use a five-point Likert-type scale to rate responses from 1 (*definitely not true*) to 5 (*definitely true*). Twenty-four items on the CHEXI yield two subscale scores: working memory (13 items; 1, 3, 6, 7, 9, 12, 14, 17, 19, 20, 21, 23, 24) and



inhibition (11 items; 2, 4, 5, 8, 10, 11, 13, 15, 16, 18, 22). An example working memory item is “Has difficulty understanding verbal instructions unless he/she is also shown how to do something.” An example inhibition item is “Has difficulty refraining from smiling or laughing in situations where it is inappropriate.” As evident from the wording of the items, higher scores indicate more difficulty with working memory and inhibition, respectively (i.e., the reverse of what the subscale names suggest).

Thorell and Nyberg (2008a) determined the dimensionality of the CHEXI through factor analysis, as did Camerota et al. (2018). Based on the loadings Thorell and Nyberg reported, I computed composite reliabilities for working memory and inhibition as .89 each. Thorell and Nyberg found working memory and inhibition to be positively correlated with their respective laboratory measures, positively correlated with attention-deficit/hyperactivity disorder measures of hyperactivity/impulsivity and inattention, and negatively correlated with language skills and mathematics measures. These relationships were in the direction expected and established the validity of the CHEXI working memory and inhibition scales. Appendix C has a copy of the permission letter to use the CHEXI in my research.

### ***Parental Warmth***

Boel-Studt and Renner’s (2013a, 2013b) five-item scale was used to measure parental warmth. Parents will self-report having a close relationship with their kindergarten child, communicating with them about a variety of topics, expressing their affection, having a great time together, and reassuring them they are always there for them. Respondents gave each item a rating using a four-point Likert scale of 1 (*strongly*

*disagree*), 2 (*disagree*), 3 (*agree*), and 4 (*strongly agree*), with higher scores indicating more warmth. Boel-Studt and Renner (2013a) reported a Cronbach's alpha of .83, indicating good reliability. The parental warmth measure may be reproduced and used for educational purposes without seeking written permission (Boel-Studt & Renner, 2013b).

### ***Socioeconomic Status***

SES is commonly measured by one or more so-called objective indices assessing the level of education, income, and occupational prestige (Diemer et al., 2012; National Center for Education Statistics, 2012). Historically, there has been considerable inconsistency in operationalizing each of these three components of SES, as well as analyzing each separately or in some combined form (e.g., principal components scores) (Diemer et al., 2012). To address the inconsistencies and resulting issues of reliability and validity of research results, researchers have been using a single item to index subjective or perceived SES (Diemer et al., 2012; National Center for Education Statistics, 2012; Navarro-Carrillo et al., 2020; Tan et al., 2020).

Single-item subjective measures of SES have been shown to correlate with objective measures (Navarro-Carrillo et al., 2020; Tan et al., 2020), predictive of physical and mental health after controlling for objective SES (Demakakos et al., 2008), predictive of psychological well-being after controlling for objective SES (Navarro-Carrillo et al., 2020), predictive of children's intergroup attitudes (Mistry et al., 2015), and a simpler and more sensitive measure of SES than objective measures (Svedberg et al., 2016). Consistent with the various single-item assessments of SES in the literature (see Diemer et al., 2012), I created the following item for my study: SES has been defined as “not just

income but also educational attainment, financial security, and subjective perceptions of social status and social class” (American Psychological Association, n.d., para. 1). Based on this definition of SES, please rate your SES relative to that of other adults in the United States as 1 (*below the average SES of others*), 2 (*average SES*), 3 (*above the average SES of others*).

### ***Demographic Items***

In order to describe the sample and understand potential generalizability of results, some common demographic information will be collected. This includes the participants’ sex, age (in years), race/ethnicity, highest level of education, and household income category. The exact working of each demographic item can be found in Appendix D.

### **Research Questions, Hypothesis, and Data Analysis Plan**

Six research questions guide my study. The first two relate, respectively, to the combined and relative effects, respectively, of parental warmth, the seven dimensions of parenting style, and parents’ subjective SES in explaining variance in working memory executive function scores. The following two relate to the combined and relative effects, respectively, of the same set of predictors in accounting for variance in inhibition executive function scores. Because the same set of predictors will be used, the fifth research question relates to comparing the variance accounted for in working memory versus inhibition. Finally, a sixth research question, for exploratory purposes only, seeks to determine the key study variables that differ by self-rated subjective SES.

RQ1: What is the combined effect ( $R^2$ ) of parental warmth, the seven dimensions of parenting style, and parents' SES in accounting for variance in kindergarteners' working memory executive function scores?

$H_01$ : Parental warmth, the seven dimensions of parenting style, and a parents' SES do not account for variance ( $R^2$ ) in working memory executive function scores at alpha = .05.

$H_{a1}$ : Parental warmth, the seven dimensions of parenting style, and the parents' SES do account for variance ( $R^2$ ) in working memory executive function scores at alpha = .05.

RQ2: What are the relative effects squared semi-partial correlation and relative weight of parental warmth, the seven dimensions of parenting style, and parents' SES in accounting for variance in working memory executive function scores?

There is no statistical test yielding a probability value for comparing the squared semi-partial correlation or relative weight of predictors, so hypotheses cannot be tested and are therefore not applicable. The squared semi-partial correlation ( $sr^2$ ) is the amount of variance in the outcome variable that is uniquely accounted for by a predictor and is interpreted in rank order fashion (Tabachnick & Fidell, 2007). Johnson's  $\epsilon$  corrects for intercorrelations among predictors (Johnson, 2000; Lorenzo-Seva et al., 2010), yielding relative weights for each predictor that sums to 1, allowing interpretations disentangled from predictor correlations and has been shown superior to other relative importance indicators (Johnson & LeBreton, 2004).

RQ3: What is the combined effect ( $R^2$ ) of parental warmth, parenting style, and parents' SES in accounting for variance in kindergarteners' inhibition executive function scores?

$H_{03}$ : Parental warmth, the seven dimensions of parenting style, and the parents' SES do not account for variance ( $R^2$ ) in inhibition executive function scores at  $\alpha = .05$ .

$H_{a3}$ : Parental warmth, the seven dimensions of parenting style, and the parents' SES do account for variance ( $R^2$ ) in inhibition executive function scores at  $\alpha = .05$ .

RQ4: What are the relative effects squared semi-partial correlation and relative weight of parental warmth, the seven dimensions of parenting style, and parents' SES in account for variance in inhibition executive function scores?

As detailed for RQ2, hypotheses are not possible for RQ4.

RQ5: To what extent do parental warmth, the seven dimensions of parenting style, and parents' SES differentially account for variance in working memory versus inhibition executive function scores?

$H_{05}$ : The variance accounted for by the common set of predictors in working memory is not statistically significantly different than the variance accounted for in inhibition executive function scores.

$H_{a5}$ : The variance accounted for by the common set of predictors in working memory is statistically significantly different than the variance accounted for in inhibition executive functions scores.

RQ6 (exploratory): To what extent do scores on parental warmth, the seven dimensions of parenting style, working memory, and inhibition differ by self-rated SES?

Because RQ6 is exploratory only, hypotheses are not warranted.

Ordinary least squares regression will be used to answer RQ1-RQ4, along with rank-ordered  $s^2$  and Johnson's  $\epsilon$  to answer RQ2 and RQ4. RQ5 will be answered using Williams's  $T$  statistic (Steiger, 1980), and RQ6 will be answered by a series of one-way ANOVAs. Data were analyzed using IBM SPSS 28.0 or newer software. Prior to the analyses, the data will be cleaned and screened following procedures outlined in Diebold (2019) and Tabachnick and Fidell (2007).

Participant-mean substitution will be used for missing item data with a subscale when there is valid data for approximately 70% of the other items that make up the subscale. This is a simple, reliable, and effective way to address missing data (Downey & King, 1998; Shrive et al., 2006). Cronbach's alpha will be calculated to examine the reliability of each subscale and other items removed if they do not substantially contribute to the construct. Cases with standardized subscale scores exceeding  $\pm 3.29$  and that are substantially discontinuous with the distribution will be considered an extreme univariate outlier (Tabachnick & Fidell, 2007) and removed from further analysis. Multivariate outliers will be examined separately for each dependent variable following Tabachnick and Fidell's (2007) procedure of regressing a random variable on the dependent variable and the set of predictors. Cases with Mahalanobis values greater than 29.588 (the critical chi-square value for 10 predictors at  $\alpha = .001$ ) that are substantially discontinuous with the distribution will be considered an extreme

multivariate outlier (Tabachnick & Fidell, 2007) and removed from further analysis. The univariate normality of each subscale score will be assessed using skewness and kurtosis values. According to Kline (2016), skewness values exceeding  $\pm 3.0$  and kurtosis values exceeding  $\pm 10.0$  can be considered relatively normal and not adversely affect results.

High correlations between pairs of predictors (collinearity) and high multicollinearity of a predictor with a set of other predictors can adversely affect regression results (Tabachnick & Fidell, 2007). If a predictor regressed on the set of other predictors has a multiple- $R = .70$  or higher, multicollinearity could be of concern. Tolerance is the proportion of variance in a predictor not explained by the set of other predictors. If multiple- $R = .70$ , then  $R^2 = .49$  and tolerance =  $.51$ . So, tolerance values of  $.51$  or smaller correspond to multiple- $R$  values of  $.70$  or higher. I will report intercorrelations among predictors and tolerance values in my actual sample.

Regression results will first be examined for outlier cases with standardized residual values greater than  $\pm 3.29$ , which is discontinuous with the distribution (Tabachnick & Fidell, 2007) and removed from further analysis if warranted. A scatterplot of standardized residuals ( $y$ -axis) by standardized predicted values ( $x$ -axis) will be examined for linearity, normality, and homoscedasticity. Scatterplots that are u-shaped, n-shaped, or otherwise substantially curved weaken the statistical power of the regression results (Tabachnick & Fidell, 2007). Normality of residuals is evident in the scatterplot if the dots are thicker near the horizontal zero line and thinner and relatively equally disbursed above and below the zero line. The homoscedasticity of the residuals is indicated in the scatterplot if dots symmetrically fill a relatively rectangular shape.

Violation does not invalidate the regression result but does weaken statistical power (Tabachnick & Fidell, 2007).

After data cleaning and screening, as described above, are completed, regression results will be reported. To answer RQ1 and RQ3, the regression  $R^2$  was reported along with the observed significance value.  $R^2$  is the proportion of variance in the criterion variable that is explained by the complete set of predictor variables with small, medium, and large effects defined as .02, .13, and .26, respectively (Cohen, 1988).

To answer RQ2 and RQ4 regarding the relative significance of the predictors, the  $sr^2$  and Johnson's  $\epsilon$  was reported for each predictor (parental warmth, each of the seven parenting style dimensions, and SES). The  $sr^2$  can be directly calculated by squaring what IBM SPSS labels the part correlation in regression output. Johnson's  $\epsilon$  relative weights for each predictor will be calculated using Lorenzo-Seva et al.'s (2010) IBM SPSS syntax program. For exploratory purposes only that might aid interpretation of the previously specified analyses and that might inform directions for future research.

RQ6 was analyzed using a series of one-way ANOVAs to examine group means differences by SES level on parental warmth, each of the seven dimensions of parenting style, working memory, and inhibition. The principal focus will be reporting and interpreting the post-hoc pairwise comparisons of each SES level with the other two levels. The omnibus ANOVA result (i.e.,  $R^2$ ) will be focused on primarily as a way of rank ordering the relative importance of SES across the 10 study variables.



### **Threats to Validity**

Threats to validity can affect the study results; therefore, the researcher must identify them (Babbie, 2020). The three main types are content validity, construct validity, and criterion validity. Construct validity is defined by Rahardja et al. (2019) as the extent to which a research instrument measures the intended construct. The final measure of validity, criterion validity, contrasts two distinct instruments that measure comparable variables (Heale & Twycross, 2015; Rahardja et al., 2019). A potential threat to the validity of this research study is the variation in parenting styles, parental warmth, and SES on kindergarten students' executive functioning skills. Internal validity could be threatened because the participants in this study will use self-reporting surveys which ask about their parenting styles and their children's executive functioning skills. Instead of reporting accurate answers, parents may record what they think is right. To help minimize this threat, the researcher would ensure that participants were aware that their responses were kept confidential on the informed consent document. The population and the lack of survey responses could threaten external validity.

### **External Validity**

External validity is the ability to generalize the findings of a study to the intended population (Findley et al., 2021). Threats to external validity may occur if the researcher applies the research study results inaccurately by generalization (Creswell & Creswell, 2018). Studies have more substantial external validity when random samples are used as opposed to those who do not use random samples. This study will use purposeful sampling; therefore, the external validity should be limited. Due to the surveys in this

research being self-reporting by parents, the Hawthorne effect can threaten external validity. Parents can answer questions based on what they think will be perceived well by the researcher. The Hawthorne Effect is when people in a research study change how they do things because they are being observed, even if they do not know what aspect of their behavior is being examined (Stacy, 2022).

### **Internal Validity**

The extent to which a research study establishes a reliable cause-and-effect relationship is its internal validity (Flannelly et al., 2018). Internal validity can be compromised by certain procedures, interventions, or subjects' experiences, preventing or corrupting the researcher from drawing accurate conclusions (Flannelly et al., 2018). It can also be threatened by measurement errors, or by the selection of study participants. To increase the internal validity of the study, the researcher must ensure that the sample size, recruitment strategies, data collection, and data analysis are appropriate. If the results show that the variations in parenting styles, parental warmth, and SES relate to the executive functions of kindergarten students' internal validity is suggested but cannot be proven via correlations.

### **Construct and Statistical Conclusion Validity**

Construct validity refers to how well a test measures the concept it was designed to measure explicitly (Frankfort-Nachmias & Nachmias, 2008). If findings from a statistical study are accurate, this is known as statistical conclusion validity. When unreported measurement flexibility leads to many comparisons in a statistical test, the test's findings may be biased; this is difficult to verify. Statistical Conclusion Validity

occurs when a sufficient data analysis supports the conclusions of a research study or when appropriate statistical methods are logically capable of answering the research question employed. When unrevealed measurement flexibility leads to numerous comparisons in a statistical test, this can be difficult to verify, and the test results may be biased (Flake & Fried, 2020).

### **Ethical Procedures**

Researchers conducting studies must adhere to ethical procedures to protect the anonymity and privacy of participants (Frankfort-Nachmias & Nachmias, 2008). IRB approval (09-29-23-0609305.) was received from Walden University to conduct this research study, participants will be informed about all study aspects and how they may be affected.

After receiving approval from Walden's IRB, I notified Centiment of the nature of this study which examines the relationship between parenting styles and kindergarten students executive functioning abilities. I told them the population needed for this research study was parents with kindergarten students. I provided Centiment LLC with an invitation to participate (Appendix E) that they can send out to their Audience Panel. The invitation (Appendix E) included details about the research study being conducted, the type of participants needed, and states this study was voluntary. If Centiment's Audience Panel members chose to participate, they would be given the informed consent form (Appendix F) embedded in the survey. The informed consent form describes the study's purpose and duration, as well as each participant's right to withdraw from the study at any time. Risks, benefits and privacy would be safeguarded (Appendix F). Centiment

LLC gives their members identification numbers for when they participate in surveys. I cannot access these numbers; therefore, members who choose to participate will remain completely anonymous to the researcher. Participants will be paid a small fee for their participation, but the researcher will not pay it. Centiment LLC directly pays their audience panel members who participate in research studies. The research data for this study will be kept on a password-protected computer in a locked filing cabinet in my home office. All data from this investigation will be deleted after 5 years.

### **Summary**

This static group comparison and quantitative correlational study will examine the effects of parenting style, parental warmth, and parental SES on kindergarteners' executive function skills. Chapter 3 focuses on identifying the research design and its relationship to the research questions, methodology, and validity threats. The population, sampling and sampling procedures, data type and data collection, and ethical procedures associated with the central theme of the study will be described, along with the justification for employing a quantitative method. Chapter 4 will review the purpose of the study, research questions hypotheses, data collection and analysis, and an in-depth discussion of the results from the data analysis.

## Chapter 4: Results

### Introduction

The purpose of this quantitative research study was to examine how parental warmth, seven dimensions of parenting style, and parents' SES affect the working memory and inhibition of executive functioning skills of kindergarten students. In this chapter, I present the data collected during this study. The survey used in this study included the PSDQ, CHEXI, parental warmth questionnaire, and demographic information. The six research questions along with the corresponding hypotheses are below:

RQ1: What is the combined effect ( $R^2$ ) of parental warmth, the seven dimensions of parenting style, and parents' SES in accounting for variance in kindergarteners' working memory executive function scores?

$H_01$ : Parental warmth, the seven dimensions of parenting style, and a parents' SES do not account for variance ( $R^2$ ) in working memory executive function scores at alpha = .05.

$H_{a1}$ : Parental warmth, the seven dimensions of parenting style, and the parents' SES do account for variance ( $R^2$ ) in working memory executive function scores at alpha = .05.

RQ2: What are the relative effects squared semi-partial correlation and relative weight of parental warmth, the seven dimensions of parenting style, and parents' SES in accounting for variance in working memory executive function scores?

There is no statistical test yielding a probability value for comparing the squared semi-partial correlation or relative weight of predictors, so hypotheses cannot be tested and are therefore not applicable. The squared semi-partial correlation ( $sr^2$ ) is the amount of variance in the outcome variable that is uniquely accounted for by a predictor and is interpreted in rank order fashion (Tabachnick & Fidell, 2007). Johnson's  $\epsilon$  corrects for intercorrelations among predictors (Johnson, 2000; Lorenzo-Seva et al., 2010), yielding relative weights for each predictor that sums to 1, allowing interpretations disentangled from predictor correlations and has been shown superior to other relative importance indicators (Johnson & LeBreton, 2004).

RQ3: What is the combined effect ( $R^2$ ) of parental warmth, parenting style, and parents' SES in accounting for variance in kindergarteners' inhibition executive function scores?

$H_{03}$ : Parental warmth, the seven dimensions of parenting style, and the parents' SES do not account for variance ( $R^2$ ) in inhibition executive function scores at  $\alpha = .05$ .

$H_{a3}$ : Parental warmth, the seven dimensions of parenting style, and the parents' SES do account for variance ( $R^2$ ) in inhibition executive function scores at  $\alpha = .05$ .

RQ4: What are the relative effects squared semi-partial correlation and relative weight of parental warmth, the seven dimensions of parenting style, and parents' SES in account for variance in inhibition executive function scores?

As detailed for RQ2, hypotheses are not possible for RQ4.

RQ5: To what extent do parental warmth, the seven dimensions of parenting style, and parents' SES differentially account for variance in working memory versus inhibition executive function scores?

$H_{05}$ : The variance accounted for by the common set of predictors in working memory is not statistically significantly different than the variance accounted for in inhibition executive function scores.

$H_{a5}$ : The variance accounted for by the common set of predictors in working memory is statistically significantly different than the variance accounted for in inhibition executive functions scores.

RQ6 (exploratory): To what extent do scores on parental warmth, the seven dimensions of parenting style, working memory, and inhibition differ by self-rated SES?

Because RQ6 is exploratory only, hypotheses are not warranted.

An ordinary least squares regression was used to answer RQ1–RQ4 and rank-ordered  $sr^2$  and Johnson's  $\epsilon$  were used to answer RQ2 and RQ4. Williams's  $T$  statistic (Steiger, 1980) was used to answer RQ5, and RQ6 was answered by a series of one-way ANOVAs. This chapter includes a summary of the sample population, participant demographics, and descriptive and correlational statistics supporting or contradicting the hypotheses.

### **Data Collection**

After obtaining IRB approval (09-29-23-0609305) the data collection for this study took place October 6–10, 2023. The CHEXI, PSDQ, and parental warmth questionnaire, three already-existing instruments, coupled with demographic questions

was used in an online survey that was submitted to Centiment LLC's online survey platform. Centiment LLC released the survey to their audience panel across the United States who were parents of kindergarten students who attended public school; 122 individuals completed the survey. Upon accessing the survey, the participants were presented with an informed consent document that explicitly notified them of their right to withdraw from the survey at any point without incurring negative consequences. Because the survey was submitted to Centiment who in turn released it to their audience panel, the panel members' identification was kept confidential; therefore, I did not have access to participants' identities.

In Chapter 3, I stated SES would be examined to determine group differences on parental warmth, each of the seven parenting styles dimensions, and the two executive function subscale scores. The single-item SES was inadvertently left off the survey; therefore, educational level and income level were used as proxy variables for SES.

### **Initial Reliability Analysis**

Cronbach's alpha ( $\alpha$ ) was calculated to examine the reliability of each subscale. The initial reliability for the five-item PSDQ warmth and support subscale had a Cronbach's  $\alpha$  of .709, but PSDQ Item 1 ("I am responsive to our child's feelings or needs") had small correlations with the other four items ranging from .13 to .18. Removing Item 1 substantially improved Cronbach's  $\alpha$  to .739. The five-item PSDQ autonomy subscale had a Cronbach's  $\alpha$  of .678 but could not be improved. This variable will be interpreted cautiously because of its low reliability. The five-item PSDQ permissive subscale had a Cronbach's  $\alpha$  of .630. Item 24 ("I spoil our child") had small



correlations of .10, .18, .14, and .23 with the other items. Removing Item 24 substantially improved  $\alpha$  to .652, though still low and was cautiously interpreted. The seven other subscales had sufficient reliability: PSDQ reasoning ( $\alpha = .724$ ), PSDQ physical coercion ( $\alpha = .808$ ), PSDQ verbal hostility ( $\alpha = .783$ ), PSDQ nonreasoning ( $\alpha = .732$ ), CHEXI working memory ( $\alpha = .943$ ), CHEXI inhibition ( $\alpha = .911$ ), and parental warmth ( $\alpha = .775$ ).

### **Screening for Univariate Outliers**

Mean composite scores were created for each of the 10 subscales, then standardized scores were computed to facilitate identification of univariate outliers. Cases with standardized scores exceeding  $\pm 3.29$  and that were substantially discontinuous with the rest of the cases were considered a univariate outlier (Tabachnick & Fidell, 2007). One case (ID97) had a value of  $-4.27$  and was substantially discontinuous with the other cases (nearest case  $-3.88$ ) on the warmth and support subscale. ID97 also had a value of  $-3.88$  and was substantially discontinuous with the other cases (nearest case  $-2.67$ ) on the reasoning scale. One case (ID79) had a value of  $4.03$  and was substantially discontinuous with the other cases (nearest case  $3.38$ ) on the physical coercion scale. ID79 also had a value of  $3.38$  and was substantially discontinuous with the other cases (nearest case  $2.78$ ) on the nonreasoning scale. One case (ID85) had a value of  $-4.71$  and was substantially discontinuous with the other cases (nearest case  $-3.09$ ) on the parental warmth scale. As univariate outliers, these three cases were eliminated from further analysis.

### **Screening for Multivariate Outliers**

Following Tabachnick and Fidell (2007), multivariate outliers were examined by regressing a random variable on the 10 subscales. One case (ID83) had a value of 38.259 that exceeded the critical chi square of 29.588 and was substantially discontinuous with the rest of the cases. ID83 was removed from further analysis. With the three univariate outliers and one multivariate outlier removed, 118 cases remained for further analysis.

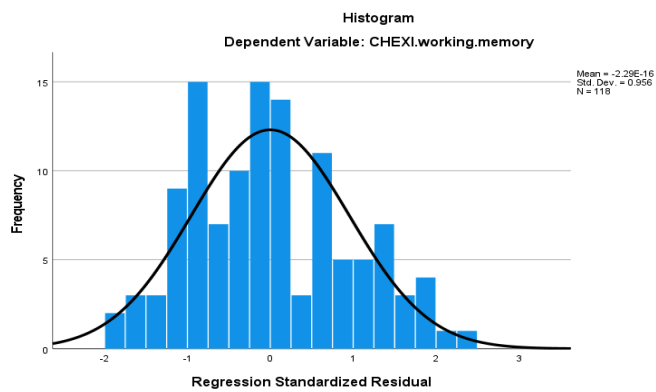
### **Regression Assumptions**

#### ***CHEXI Working Memory Regression***

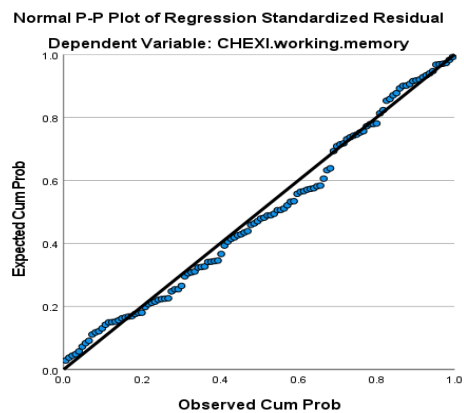
A preliminary regression was conducted to examine substantial violation of regression assumptions. Because the single-item SES was inadvertently left off the survey, education level and income level were used as proxy variables for SES. Tolerance values were acceptable, ranging from .44 to .76, so multicollinearity was not deemed an issue. Standardized residuals ranged from  $-1.90$  to  $2.41$ , so there were no regression outliers. A histogram (Figure 1) and normal P-P plot (Figure 2) of standardized residuals indicated a relatively normal distribution. The scatterplot of standardized residuals by standardized predicted values (Figure 3) appeared relatively linear and homoscedastic.

**Figure 1**

*Working Memory Histogram of Standardized Residuals*

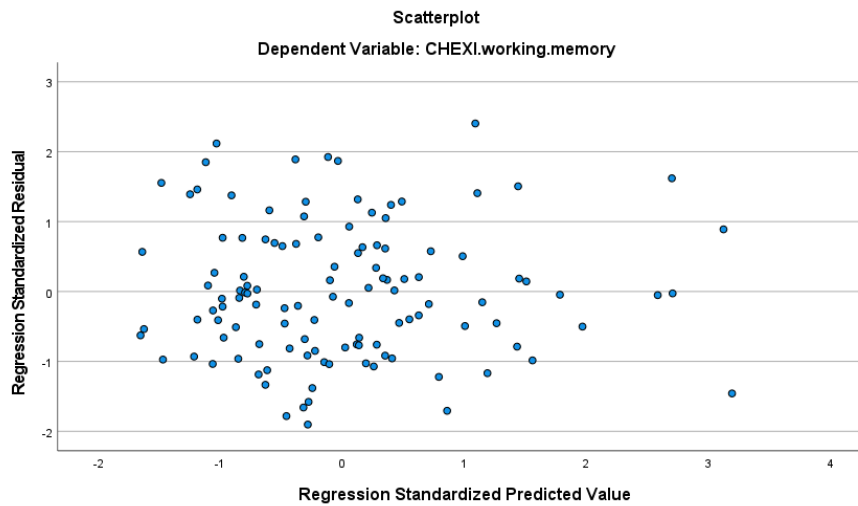
**Figure 2**

*Working Memory Normal P-P Plot of Standardized Residuals*



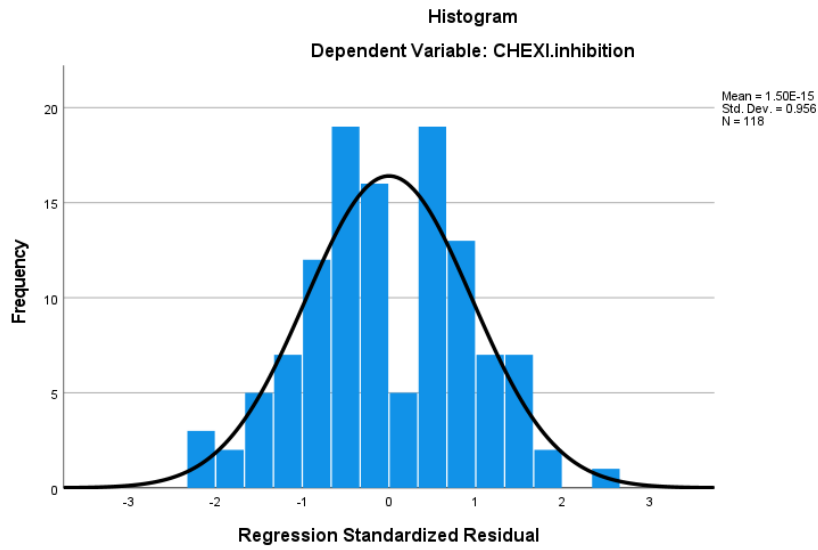
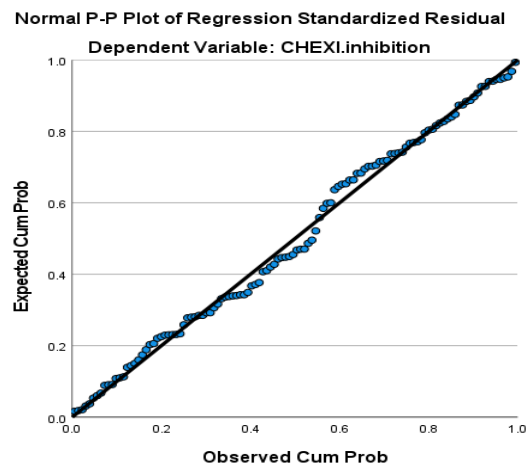
### Figure 3

*Working Memory Scatterplot of Standardized Residuals by Standardized Predicted Values*



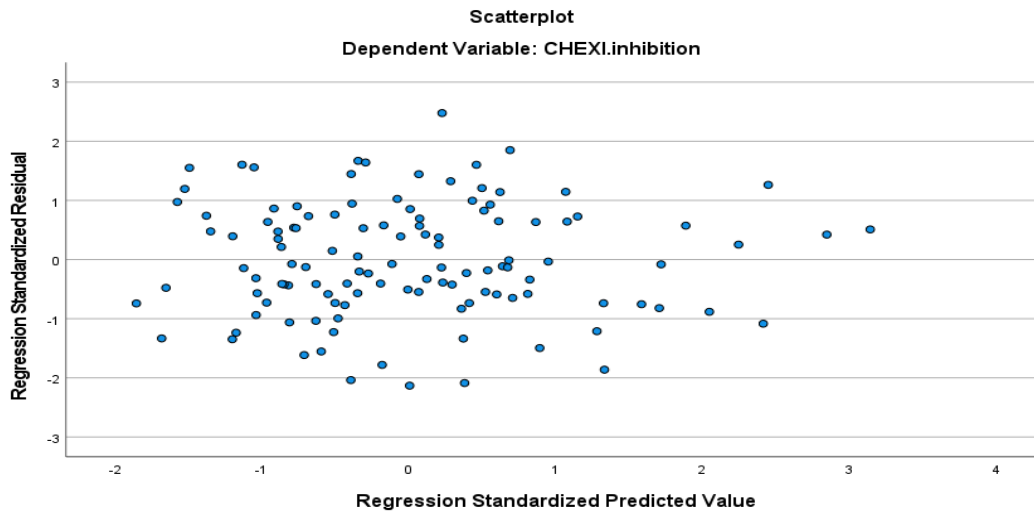
### *CHEXI Inhibition Regression*

A preliminary regression was also conducted with CHEXI inhibition as the dependent variable to examine substantial violation of regression assumptions. Tolerance values were acceptable, ranging from .44 to .76, so multicollinearity was not deemed an issue. Standardized residuals ranged from  $-2.13$  to  $2.48$ , so there were no regression outliers. A histogram (Figure 4) and normal P-P plot (Figure 5) of standardized residuals indicated a relatively normal distribution. The scatterplot of standardized residuals by standardized predicted values (Figure 6) appeared relatively linear and homoscedastic.

**Figure 4***Inhibition Histogram of Standardized Residuals***Figure 5***Inhibition Normal P-P Plot of Standardized Residuals*

**Figure 6**

*Inhibition Scatterplot of Standardized Residuals by Standardized Predicted Values*



### **Demographics of Sample**

There were slightly more female participants ( $n = 66, 55.9\%$ ) than male participants ( $n = 52, 44.1\%$ ) in the sample. Participants' ages ranged from 23 to 58, with an average age of 37.7 ( $SD = 7.41$ ). Most participants were White non-Hispanic ( $n = 69, 58.5\%$ ), followed by Black non-Hispanic ( $n = 18, 15.3\%$ ) and Hispanic or Latino ( $n = 17, 14.4\%$ ). There were more participants with high school or community college education level ( $n = 66, 55.9\%$ ) than with college or graduate school education level ( $n = 52, 44.1\%$ ). Income levels varied greatly, with about half of the participants having household income below \$60,000. A more complete breakdown of demographics is provided in Table 1.

**Table 1***Demographics Characteristics of Sample*

Variable	<i>n</i>	%
<b>Sex</b>		
Female	66	55.9
Male	52	44.1
<b>Ethnicity</b>		
Asian	10	8.5
Black or African American non-Hispanic	18	15.3
Hispanic or Latino	17	14.4
Native Hawaiian or other Pacific Islander	2	1.7
White non-Hispanic	69	58.5
Two or more races/ethnicities	2	1.7
<b>Education level</b>		
High school or GED	49	41.5
Community college	17	14.4
College	29	24.6
Graduate school	23	19.5
<b>Income level</b>		
< \$5,000	2	1.7
\$5,000–7,499	4	3.4
\$7,500–9,999	0	0.0
\$10,000–12,499	0	0.0
\$12,500–14,999	3	2.5
\$15,000–19,999	2	1.7
\$20,000–24,999	6	5.1
\$25,000–29,999	3	2.5
\$30,000–34,999	12	10.2
\$35,000–39,999	4	3.4
\$40,000–49,999	11	9.3
\$50,000–59,999	11	9.3
\$60,000–74,999	20	16.9
\$75,000–99,999	15	12.7
\$100,000–149,999	16	13.6
\$150,000 or more	9	7.6

## Results

### Descriptive Statistics

In the final valid sample of 118 participants, all subscale scores had reliability above .70 as indexed by Cronbach's alpha except autonomy granting ( $\alpha = .687$ ) and permissiveness ( $\alpha = .625$ ). Each of the 10 subscale scores had adequate variance and were relatively normally distributed as indexed by skewness and kurtosis values. Detailed descriptive statistics are provided in Table 2.

**Table 2**

*Descriptive Statistics of Scale Variables*

Scale	# items	$\alpha$	$M$	$SD$	Min	Mdn	Max	$S$	$K$
<b>CHEXI</b>									
Working memory	13	.935	2.47	0.83	1.00	2.50	4.92	0.45	0.01
Inhibition	11	.902	2.81	0.89	1.00	2.80	4.90	0.07	-0.37
<b>PSDQ</b>									
Warmth and support	4	.705	4.47	0.56	2.50	4.50	5.00	-1.51	2.54
Reasoning/induction	5	.713	4.18	0.62	2.40	4.20	5.00	-0.70	0.21
Autonomy granting	5	.687	3.70	0.76	1.60	3.70	5.00	-0.33	-0.11
Physical coercion	4	.787	1.59	0.69	1.00	1.50	4.25	2.02	4.87
Verbal hostility	4	.763	1.96	0.83	1.00	1.75	4.50	1.15	0.85
Nonreasoning	4	.714	1.91	0.80	1.00	1.75	4.25	1.19	0.66
Permissiveness	4	.625	2.24	0.82	1.00	2.00	5.00	0.81	0.66
Parental warmth	5	.726	3.76	0.33	2.60	4.00	4.00	-1.38	1.28

*Note.*  $\alpha$  = Cronbach's alpha;  $S$  = skewness;  $K$  = kurtosis.

Correlations among the 10 subscales are provided in Table 3. The CHEXI working memory and inhibition scales were very highly correlated at .84. Working memory items are negatively worded so high scores indicated poorer working memory. Working memory and inhibition scores were positively correlated with the PSDQ scales physical coercion, verbal hostility, nonreasoning, and permissiveness.



**Table 3***Correlation Matrix of Scale Variables*

Scale	1	2	3	4	5	6	7	8	9	10
1. Working memory		.84	-.12	-.11	-.05	.41	.42	.42	.47	-.14
2. Inhibition	<.001		-.10	-.01	-.07	.28	.36	.27	.36	-.07
3. Warmth and support	.198	.261		.57	.46	-.16	-.17	-.22	-.08	.52
4. Reasoning/induction	.229	.914	<.001		.36	-.12	-.12	-.27	-.15	.46
5. Autonomy granting	.560	.440	<.001	<.001		.04	.08	-.01	.13	.31
6. Physical coercion	<.001	.002	.083	.205	.680		.63	.58	.38	-.13
7. Verbal hostility	<.001	<.001	.074	.204	.400	<.001		.64	.46	-.10
8. Nonreasoning	<.001	.003	.015	.003	.930	<.001	<.001		.51	-.16
9. Permissiveness	<.001	<.001	.384	.098	.169	<.001	<.001	<.001		-.24
10. Parental warmth	.138	.459	<.001	<.001	<.001	.151	.261	.078	.010	

*Note.* Upper diagonal contains Pearson correlation coefficients, lower diagonal contains

2-tailed significance.

**Regression Analysis**

Tables 4 and 5 report the regression results for CHEXI working memory and inhibition, respectively. The seven PSDQ scale scores, parental warmth, education level, and income level statistically significantly accounted for 34.3% of the variance in CHEXI working memory scores (RQ1) and 24.6% of the variance in CHEXI inhibition scores (RQ3). The common set of predictors statistically significantly predicted working memory better than inhibition (RQ5), Williams's  $T = 3.39$ ,  $p < .001$ . Of the 10 predictors, only PSDQ permissiveness and income level statistically significantly predicted CHEXI working memory, and only PSDQ permissiveness statistically significantly predicted CHEXI inhibition. For working memory, physical coercion approached significance ( $p = .075$ ), and for inhibition income level ( $p = .053$ ), education level ( $p = .069$ ), autonomy granting ( $p = .075$ ), and verbal hostility ( $p = .092$ ) approached significance.

**Table 4***CHEXI Working Memory Regression Results*

Predictor	<i>B</i>	<i>SE<sub>B</sub></i>	<i>p</i>	95% CI	
				Lower	Upper
Constant	1.585	.881	.075	-.161	3.330
Warmth and support	-.037	.164	.823	-.361	.288
Reasoning/induction	.074	.137	.592	-.199	.346
Autonomy granting	-.159	.100	.115	-.357	.039
Physical coercion	.233	.129	.075	-.024	.489
Verbal hostility	.127	.115	.272	-.101	.354
Nonreasoning	.029	.121	.809	-.211	.270
Permissiveness	.327	.100	.001	.129	.525
Parental warmth	.069	.247	.782	-.421	.559
Education level	.074	.063	.245	-.051	.199
Income level	-.052	.023	.024	-.097	-.007

*Note.*  $R^2 = .343$ ,  $F(10, 107) = 5.58$ ,  $p < .001$ .

**Table 5***CHEXI Inhibition Regression Results*

Predictor	<i>B</i>	<i>SE<sub>B</sub></i>	<i>p</i>	95% CI	
				Lower	Upper
Constant	1.740	1.007	.087	-.257	3.736
Warmth and support	-.188	.187	.317	-.559	.183
Reasoning/induction	.246	.157	.121	-.066	.557
Autonomy granting	-.205	.114	.075	-.432	.021
Physical coercion	.104	.148	.482	-.189	.398
Verbal hostility	.223	.131	.092	-.037	.483
Nonreasoning	-.094	.139	.501	-.368	.181
Permissiveness	.346	.114	.003	.120	.572
Parental warmth	.170	.283	.550	-.391	.730
Education level	.132	.072	.069	-.010	.275
Income level	-.051	.026	.053	-.102	.001

*Note.*  $R^2 = .246$ ,  $F(10, 107) = 3.50$ ,  $p < .001$ .

Table 6 reports the squared semi-partial correlations and Johnson's epsilon values of each predictor for both the working memory (Research Question 2) and inhibition (Research Question 4) regressions. The PSDQ permissiveness score was the most

important predictor in both models, uniquely accounting for 6.61% ( $sr^2$ ) and proportionally accounting for 40.1% (Johnson's  $\epsilon$ ) of variance in working memory and uniquely accounting for 6.50% and proportionally accounting for 34.9% of the variance in inhibition. For working memory, physical coercion ( $\epsilon = 14.4\%$ ), verbal hostility ( $\epsilon = 12.3\%$ ), and nonreasoning ( $\epsilon = 11.7\%$ ) were relatively important predictors. For inhibition, verbal hostility ( $\epsilon = 12.6\%$ ) and nonreasoning ( $\epsilon = 11.5\%$ ) were relatively important.

**Table 6**

*Relative Effects of Predictors*

Predictor	Dependent variable			
	Working Memory		Inhibition	
	$sr^2$ (%)	$\epsilon$ (%)	$sr^2$ (%)	$\epsilon$ (%)
Warmth and support	0.03	2.0	0.71	6.3
Reasoning/induction	0.18	1.1	1.72	4.7
Autonomy granting	1.55	5.1	2.28	6.8
Physical coercion	1.99	14.4	0.35	7.5
Verbal hostility	0.75	12.3	2.04	12.6
Nonreasoning	0.04	11.7	0.32	11.5
Permissiveness	6.61	40.1	6.50	34.9
Parental warmth	0.05	3.0	0.25	5.3
Education level	0.84	1.9	2.38	4.4
Income level	3.22	8.4	2.70	6.0

*Note.*  $sr^2$  = squared semi-partial correlation;  $\epsilon$  = Johnson's epsilon.

**Exploratory Research Question 6 Results**

Because the single-item self-report SES was inadvertently left off the survey, education level and income level were used as proxies to address Research Question 6. In addition, I explored the relationships between age and sex with the two CHEXI subscales, seven PDSQ subscales, and parental warmth.

Education level was not statistically significantly correlated with any of the 10 scale scores. Income level was statistically significantly negatively related to working memory and inhibition; the higher one's income the better they rated their child's working memory and the lower they rated their child's level of inhibition. Income level was also statistically significantly negatively related to nonreasoning and permissiveness; the higher one's income the less likely to use nonreasoning and permissive parenting practices. Age was statistically significantly negatively related to autonomy granting and positively related to parental warmth; as age increases the less likely to grant their child autonomy, but the more likely to demonstrate parental warmth. In the dataset, sex was scored 1 (*female*) and 0 (*male*), so positive correlations mean females had higher mean scores than males and negative correlations mean males had higher mean scores than females. Females were statistically significantly higher on PDSQ warmth scale scores than males, and males were statistically significantly higher on use of physical coercion and verbal hostility. Actual correlations and significance values are reported in Table 7.

**Table 7**

*Relative Effects of Predictors*

Scale	Education level		Income level		Age		Sex	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Working memory	-.027	.772	-.237	.010	-.123	.185	-.050	.588
Inhibition	.038	.683	-.158	.087	.000	.997	-.006	.948
Warmth and support	.108	.243	.005	.958	.069	.455	.166	.072
Reasoning/induction	-.037	.689	.068	.462	.078	.400	.039	.677
Autonomy granting	.028	.767	-.066	.477	-.216	.019	.026	.776
Physical coercion	.046	.618	-.009	.924	-.044	.635	-.221	.016
Verbal hostility	-.007	.939	-.128	.168	-.079	.395	-.199	.031
Nonreasoning	-.013	.886	-.222	.016	-.055	.555	-.086	.357
Permissiveness	-.141	.127	-.200	.030	-.146	.114	-.103	.265
Parental warmth	.134	.147	.129	.163	.292	.001	.037	.692

## Summary

In summary, a total of 118 individuals participated in the survey aimed at examining the relationship between the independent variables (parental warmth, seven dimensions of parenting styles, and SES) and the dependent variables (parent's rating of their child's working memory and inhibition executive function abilities). The working memory and inhibition scales for CHEXI were very highly correlated. The PSDQ scales for physical coercion, verbal hostility, nonreasoning, and permissiveness were positively correlated with working memory and inhibition scores. Since education level and income level were used as proxies for SES, the data analysis demonstrated no statistically significant relationship between education level and ten-scale scores. Income level was statistically significantly negatively related to working memory, inhibition, nonreasoning, and permissiveness. If the respondent's income was higher, so was the rating for their child's working memory, and their inhibition score was lower. Also, if the respondents had a higher income rating, they were less likely to use the nonreasoning and permissive parenting style.

In Chapter 5, a more detailed analysis of the data is provided, followed by a discussion of the limitations of the study. Additionally, recommendations for future research are included. Moreover, I will now provide an analysis of the implications of this research study, including those for social change.

## Chapter 5: Discussion, Conclusions, and Recommendations

### **Introduction**

In this study, I explored the relationship between parental warmth, seven dimensions of parenting style, and parents' SES, and the effect it has on the executive functioning working memory and inhibition skills of kindergarten students. Previous research has shown that parenting style can significantly affect a child's physical, cognitive, emotional, and social development (Baumrind, 1991; Theresya et al., 2018). Also, the interactions a child has with their parent can impact their executive functioning skills and self-regulated learning (Berthelsen et al., 2017).

There has been limited research on how parental involvement, warmth, and SES impact a child's executive functioning skills (Ogg & Anthony, 2020). Nonetheless, research has shown an academic gap in the performance of students from high-SES families and students from low-SES families. To address this gap and potentially create programs that could emphasize positive parenting skills, I used the Centiment online survey platform to release my survey to their audience panel. The panel focused on parents across the United States who had kindergarten students in public schools. The online survey included the CHEXI, PSDQ, and parental warmth questionnaire, three already-existing instruments, coupled with demographic questions. The CHEXI measured the parent-reported executive functioning skills of their kindergarten child. The PSDQ was used to measure parenting style, which included authoritative, authoritarian, and permissive styles. The parental warmth questionnaire was another self-reporting tool for parents that was used to measure if parents had a close relationship with their child,

communicated with them, and how they expressed their affection toward their child. The demographic information included gender (male or female), age, race/ethnicity, education level, and household income.

### **Interpretation of the Findings**

RQ1 was used to determine the combined effect ( $R^2$ ) of parental warmth, the seven dimensions of parenting style, and parents' SES in accounting for variance in kindergarteners' working memory executive function scores. The findings did not support the null hypothesis and indicated that parental warmth, parenting style, and SES accounted for 34.3% of the variance in working memory scores. The nature of the interaction between a child and their parents can influence their working memory executive function scores. Children with working memory deficiencies experience difficulties in information processing and meeting the requirements of the classroom, which may impede their problem-solving abilities and higher-order thinking (Morgan et al., 2019).

RQ3 looked at the combined effect ( $R^2$ ) of parental warmth, parenting style, and parents' SES in accounting for variance in kindergarteners' inhibition executive function scores. The findings pertaining to this question do not provide evidence in favor of the null hypothesis. The results indicate a statistically significant relationship between parental warmth, the seven dimensions of parenting style, and income level in relation to inhibition executive function scores.

RQ2 looked at the relative effects (squared semi-partial correlation and relative weight) of parental warmth, the seven dimensions of parenting style, and parents' SES in

accounting for variance in working memory executive function scores. RQ4 aimed to answer the same question except accounting for variance in inhibition executive function scores. The results for the squared semi partial correlation showed the PSDQ permissiveness score was high for both working memory (6.61%) and inhibition (6.50%). This means that children with permissive parents would have a higher chance of having working memory and inhibition deficits. The same held true for the results of the Johnson's epsilon value for working memory (40.1%) and inhibition (34.9%). Some other predictors that showed variance in working memory for Johnson's epsilon value were physical coercion, verbal hostility, and nonreasoning. There was also a variance for inhibition for verbal hostility and nonreasoning. When children feel neglected and unloved it could have a negative impact on their working memory and inhibitory executive functioning skills.

RQ5 queried to what extent parental warmth, the seven parenting practice dimensions, and parents' SES differentially account for variance in working memory versus inhibition executive function scores. The statistical analysis employed a Williams t-test to ascertain the level of significance between the two data sets. The findings indicated that two factors from the PSDQ were shown to have a statistically significant impact on working memory: permissive parenting style and economic level. Permissiveness was the only factor that had a statistically significant impact on inhibition.

RQ6 inquired to what extent do scores on parental warmth, the seven dimensions of parenting style, working memory, and inhibition differ by self-rated SES. Because the



self-reported SES was inadvertently left off the survey, educational level and income were used as proxies. There was no statistically significant correlation between education level and any of the 10 scale scores. The relationship between income level and working memory and inhibition were statistically significantly negative; the higher one's income, the better they assessed their child's working memory and the lower their child's degree of inhibition. There was a substantial negative correlation between income level and nonreasoning and permissiveness. Individuals with higher income were less likely to engage in nonreasoning and permissive parenting practices. There was a strong negative correlation between age and autonomy granting, and a positive correlation between age and parental warmth. The older parents were less likely to grant their child autonomy, while their tendency to demonstrate parental warmth increased. Women exhibited significantly higher scores on the PDSQ warmth scale compared to men; whereas, men demonstrated significantly higher scores on the use of physical coercion and verbal anger.

### **Limitations of the Study**

This study's focus was limited to parents of kindergarten students in public schools in the United States. Another limitation was the study being a self-reporting survey on parenting styles and parent interactions and impact on a child's executive functioning skills. My goal was to have 128 participants complete the study; however, 122 participants completed the online survey, and only 118 surveys were valid. There may have been some unfavorable aspects of the survey that could have impacted the outcomes. For example, the survey's duration and number of questions may have had a

significant impact on whether respondents opted to answer at random or provided their best effort on every item. Moreover, the survey length could have influenced the choice of certain individuals to abstain from fully completing the survey.

### **Recommendations**

The objective of the present study was to investigate the potential correlation between parental warmth, the seven characteristics of parenting style, and parent's SES on a kindergartener's working memory and inhibition executive function skills. The results revealed that parental warmth, parenting style, and SES were strong predictors of working memory and inhibition of executive function abilities in kindergarten children. Upon concluding my research, I contemplated alternative subjects that could serve as prospective avenues for future investigation. Hence, I propose that this investigation be duplicated with diverse demographics in various regions. My research specifically targeted parents of children in kindergarten. By replicating my study and including parents of children in preschool, first grade, and second grade, we can gain further insight into the impact of parental warmth, parenting styles, and SES on working memory and inhibitory executive functioning skills. The participants resided in various geographical regions in the United States. Narrowing the attention to a particular geographic location could yield greater understanding of the specific requirements of that area.

### **Implications**

Positive social change, as stated by Walden University (2023), leads to the improvement of human social conditions. This research study aims to enhance parent-child interactions by using Bandura's social learning theory (Bandura, 1969; Wulfert,

2019) and Baumrind's theoretical framework (1967). The objective is to improve the development of a child's working memory and inhibition executive function skills. The study's findings showed that parental warmth, parenting style, and income level can impact a child's working memory and inhibition executive functioning skills. Out of the four parenting styles children from homes where permissive parenting practices were used had working memory and inhibition deficits. By taking into account the findings of this research this study could contribute to facilitating social transformation by advocating and implementing parenting programs aimed at enhancing parents' positive parenting skills. For example, if a parenting style is determined to be particularly beneficial for a child, parenting classes can prioritize the parent's cultivation and promotion of this style. Previous research revealed that specific forms of participation in a child's life positively impacts the child's academic performance and social development. Therefore, parents can be motivated through social programs to actively participate in their children's lives and foster a better parent/child relationship which benefits the family and school dynamic and society as a whole. In addition to programs that benefit parents, creating and implementing educational programs will help enhance a child's executive functioning skills. School officials, parent-teacher associations, and teachers can promote and support various methods of engaging with and participating in children's lives. These strategies can assist parents in raising resilient and well-adjusted children.

## Conclusions

The scope of my research was centered around parents of kindergarten-aged children enrolled in public schools. One of my goals was to examine the existence of a positive correlation between parenting styles, parental warmth, and SES. I was also curious about the potential impact of parenting methods on the development of a child's executive functioning capabilities, specifically their working memory and inhibition abilities.

Also, it is advisable to involve parents of children who are not in kindergarten to gain a more comprehensive understanding of parenting styles, parental warmth, SES, and their influence on the child's working memory and inhibition executive functioning skills. Future research is expected to enhance public and professional understanding of the importance of executive functioning skills in children. A better understanding would allow for interventions that target executive functions, which in turn will help address the academic disparity between students from high-SES homes and those from low-SES families. Previous research has revealed how parents bring up their children can significantly influence the child's physical, cognitive, emotional, and social development (Baumrind, 1991; Theresya et al., 2018). Furthermore, this research is expected to enhance and create additional programs for parents that prioritize the cultivation of positive parenting abilities.

## References

- Ackerman, D. J., & Friedman, K. A. H. (2017). Preschoolers' executive function: Importance, contributors, research needs, and assessment options. *ETS Research Reports Series*, 2017(1), 1–24. <https://doi.org/10.1002/ets2.12148>
- American Psychological Association. (n.d.). *Education & socioeconomic status*. <https://www.apa.org/pi/ses/resources/publications/factsheet-education.pdf>
- Anthony, C. J., & Ogg, J. (2020). Executive function, learning-related behaviors, and science growth from kindergarten to fourth grade. *Journal of Educational Psychology*, 112(8), 1563–1581. <https://doi.org/10.1037/edu0000447>
- Babbie, E. R. (2020). *The practice of social research*. Cengage learning.
- Bandura, A. (1969). Social learning moral judgment. *Journal of Personality and Social Psychology*, 11(3), 275–279. <https://doi.org/10.1037/h0026998>
- Banerjee, P. A. (2016). A systematic review of factors linked to disadvantaged students' poor academic performance in science and math in schools. *Cogent Education*, 3(1), 1178441. <https://doi.org/10.1080/2331186x.2016.1178441>
- Baumrind, D. (1967). Childcare practices anteceding three patterns of preschool behavior. *Genetic Psychology Monographs*, 75, 43-88.
- Baumrind, D. (1978). Parental disciplinary patterns and social competence in children. *Youth & Society*, 9(3), 239–267. <https://doi.org/10.1177/0044118X7800900302>
- Baumrind, D. (1991). The influence of parenting style on adolescent competence and substance use. *The Journal of Early Adolescence*, 11(1), 56–95. <https://doi.org/10.1177/02724316911111004>

- Bernier, A., Carlson, S. M., Deschenes, M., & Matte-Gagne, C. (2012). Social factors in the development of early executive functioning: A closer look at the caregiving environment. *Developmental Science, 15*(1), 12–24.  
<https://doi.org/10.1111/j.1467-7687.2011.01093.x>
- Berthelsen, D., Hayes, N., White, S. L., & Williams, K. E. (2017). Executive function in adolescence: Associations with child and family risk factors and self-regulation in early childhood. *Frontiers in Psychology, 8*.  
<https://doi.org/10.3389/fpsyg.2017.00903>
- Blair, C. (2016). Developmental science and executive function. *Current Directions in Psychological Science, 25*(1), 3–7. <https://doi.org/10.1177/0963721415622634>
- Blankson, A. N., O'Brien, M., Leerkes, E. M., Marcovitch, S., & Calkins, S. D. (2011). Shyness and vocabulary: The roles of executive functioning and home environmental stimulation. *Merrill-Palmer Quarterly, 57*(2), 105–128.  
<https://doi.org/10.1353/mpq.2011.0007>
- Boel-Studt, S., & Renner, L. M. (2013a). Individual and familial risk and protective correlates of physical and psychological peer victimization. *Child Abuse & Neglect, 37*(12), 1163–1174. <https://doi.org/10.1016/j.chiabu.2013.07.010>
- Boel-Studt, S., & Renner, L. M. (2013b). Parental warmth measure [Database record]. Retrieved from PsycTESTS. <https://doi.org/10.1037/t28999-000>
- Buttelmann, F., & Karbach, J. (2017). Development and plasticity of cognitive flexibility in early and middle childhood. *Frontiers in Psychology, 8*.  
<https://doi.org/10.3389/fpsyg.2017.01040>

- Buttelmann, F., Könen, T., Hadley, L. V., Meaney, J. A., Auyenug, B., Morey C. C., Chevalier, N., & Karbach, J. (2019). Age-related differentiation in verbal and visuospatial working memory processing in childhood. *Psychological Research*, *84*, 2354–2360. <https://doi.org/10.1007/s00426-019-01219-w>
- Camerota, M., Willoughby, M. T., Kuhn, L. J., & Blair, C. B. (2018). The childhood executive functioning inventory (CHEXI): Factor structure, measurement invariance, and correlates in US preschoolers. *Child Neuropsychology*, *24*(3), 322–337. <https://doi.org/10.1080/09297049.2016.1247795>
- Campbell, D. T., & Stanley, J. C. (1963). *Experimental and quasi-experimental designs for research*. Houghton Mifflin.
- Centiment. (n.d.a). *Audience panel*. <https://www.centiment.co/audience-panel>
- Centiment. (n.d.b). *Survey tool: How you ask matters*. <https://www.centiment.co/survey-tool>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155–159. <https://doi.org/10.1037/0033-2909.112.1.155>
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2013). *Applied multiple regression/correlation analysis for the behavioral sciences*. Routledge.
- Conway, A., Waldfoegel, J., & Wang, Y. (2018). Parent education and income gradients in children’s executive functions at kindergarten entry. *Children and Youth Services Review*, *91*, 329–337. <https://doi.org/10.1016/j.childyouth.2018.06.009>

- Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design & analysis issues for field settings*. Houghton Mifflin Company.
- Cortés Pascual, A., Moyano Muñoz, N., & Quílez Robres, A. (2019). The relationship between executive functions and academic performance in primary education: Review and meta-analysis. *Frontiers in Psychology, 10*.  
<https://doi.org/10.3389/fpsyg.2019.01582>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods* (5<sup>th</sup> ed.). Sage.
- Daniel, J. (2012). *Sampling essentials: Practical guidelines for making sampling choices*. Sage Publications, Inc. <https://doi.org/10.4135/9781452272047>
- Demakakos, P., Nazroo, J., Breeze, E., & Marmot, M. (2008). Socioeconomic status and health: The role of subjective socioeconomic status. *Social Science and Medicine, 67*(2), 330–340. <https://doi.org/10.1016/j.socscimed.2008.03.038>
- Diamond, A. (2016). Why improving and assessing executive functions early in life is critical. In J. A. Griffin, P. McCardle, & L. S. Freund (Eds.), *Executive function in preschool-age children: Integrating measurement, neurodevelopment, and translational research*. (pp. 11–43). American Psychological Association.
- Diebold, C. T. (2019). *General guide to IBM SPSS univariate and multivariate screening for assumptions and limiting conditions*. Unpublished manuscript. Department of Psychology, Walden University, Minneapolis, MN.
- Diemer, M. A., Mistry, R. S., Wadsworth, M. E., Lopez, I., & Reimers, F. (2012). Best practices in conceptualizing and measuring social class in psychological research.



*Analyses of Social Issues and Public Policy*, 13(1), 77-113. <https://doi.org/10.1111/asap.12001>

Downey, R. G., & King, C. V. (1998). Missing data in Likert ratings: A comparison of replacement methods. *Journal of General Psychology*, 125(2), 175-191.  
<https://doi.org/10.1080/00221309809595542>

Duncan, R. J., McClelland, M. M., & Acock, A. C. (2017). Relations between executive function, behavioral regulation, and achievement: moderation by family income. *Journal of Applied Developmental Psychology*, 49, 21–30.  
<https://doi.org/10.1016/j.appdev.2017.01.004>

Faul, F., Erdfelder, E., Buchner, A., & Lang, A-G., (2009). Statistical power analyses using G\*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41, 1149-1160. <https://doi.org/10.3758/brm.41.4.1149>

Flake, J. K., & Fried, E. I. (2020). Measurement Schmeasurement: Questionable measurement practices and how to avoid them. *Advances in Methods and Practices in Psychological Science*, 3(4), 456-465.  
<https://doi.org/10.1177/2515245920952393>

Fereshteh, G., Mahin, N., & Hamideh, G. (2017). Snowball sampling: Purposeful method of sampling in qualitative research. *Strides in Development of Medical Education*, 14(3). <https://doi.org/10.5812/sdme.67670>

Findley, M. G., Kikuta, K., & Denly, M. (2021). External validity. *Annual Review of Political Science*, 24, 365-393. <https://doi.org/10.1146/annurev-polisci-041719-102556>

- Flannelly, K. J., Flannelly, L. T., & Jankowski, K. R. B. (2018). Threats to the internal validity of experimental and quasi-experimental research in healthcare. *Journal of Health Care Chaplaincy*, 24(3), 107–130.  
<https://doi.org/10.1080/08854726.2017.1421019>
- Follmer, D. J., & Sperling, R. A. (2016). The mediating role of metacognition in the relationship between executive function and self-regulated learning. *British Journal of Educational Psychology*, 86(4), 559–575.  
<https://doi.org/10.1111/bjep.12123>
- Frankfort-Nachmias, C., & Nachmias, D. (2008). *Research methods in the social sciences* (7th ed.). Worth
- Fuhs, M. W., Farran, D. C., & Nesbitt, K. T. (2015). Prekindergarten children's executive functioning skills and achievement gains: The utility of direct assessments and teacher ratings. *Journal of Educational Psychology*, 107(1), 207–221.  
<https://doi.org/10.1037/a0037366>
- Funahashi, S. (2017). Working memory in the prefrontal cortex. *Brain Sciences*, 7(5), 49.  
<https://doi.org/10.3390/brainsci7050049>
- Geldhof, G. J., Preacher, K. J., & Zyphur, M. J. (2014). Reliability estimation in a multilevel confirmatory factor analysis framework. *Psychological Methods*, 19(1), 72-91. <https://doi.org/10.1037/a0032138>
- Gurdal, S., Lansford, J. E., & Sorbring, E. (2016). Parental perceptions of children's agency: Parental warmth, school achievement, and adjustment. *Early Child Development and Care*, 186(8), 1203-1211.

<https://doi.org/10.1080/03004430.2015.1083559>

- Haft, S. L., & Hoeft, F. (2017). Poverty's impact on children's executive functions: Global considerations. *New Directions for Child & Adolescent Development*, 2017(158), 69–79. <https://doi.org/10.1002/cad.20220>
- Hair, N. L., Hanson, J. L., Wolfe, B. L., & Pollak, S. D. (2015). Association of child poverty, brain development, and academic achievement. *JAMA Pediatrics*, 169(9), 822-829. <https://doi.org/10.1001/jamapediatrics.2015.1475>
- Heale, R., & Twycross, A. (2015). Validity and reliability in quantitative studies. *Evidence-Based Nursing*, 18(3), 66–67. <https://doi.org/10.1136/eb-2015-102129>
- Jiang, Y., Granja, M. R., & Koball, H. (2017). *Basic facts about low-income children: Children under 6 years, 2015*. New York: National Center for Children in Poverty, Columbia University Mailman School of Public Health.
- Johnson, J. W. (2000). A heuristic method for estimating the relative weight of predictor variables in multiple regression. *Multivariate Behavioral Research*, 35(1), 1-19. [https://doi.org/10.1207/s15327906mbr3501\\_1](https://doi.org/10.1207/s15327906mbr3501_1)
- Johnson, J. W., & LeBreton, J. M. (2004). History and use of relative importance indices in organizational research. *Organizational Research Methods*, 7(3), 238-257. <https://doi.org/10.1177/1094428104266510>
- Jones, D. E., Greenberg, M., & Crowley, M. (2015). Early social-emotional functioning and public health: The relationship between kindergarten social competence and future wellness. *American Journal of Public Health*. <https://doi.org/10.2105/AJPH.2015.302630>

- Kao, K., Nayak, S., Doan, S. N., & Tarullo, A. R. (2018). Relations between parent EF and child EF: The role of socioeconomic status and parenting on executive functioning in early childhood. *Translational Issues in Psychological Science*, 4(2), 122–137. <https://doi.org/10.1037/tps0000154>
- Kashahu, L., Dibra, G., Osmanaga, F., & Bushati, J. (2014). The relationship between parental demographics, parenting styles, and student academic achievement. *European Scientific Journal*, 10(13).
- Kececi, A., Dogan, C. D., & Gonullu, I. (2022). Assessment preferences of nursing and medical students: A correlational research. *Nurse Education in Practice*, 60. <https://doi.org/10.1016/j.nepr.2022.103305>
- Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.
- Lawson, G. M., Hook, C. J., Hackman, D. A., & Farah, M. J. (2016). Socioeconomic status and the development of executive function: Behavioral and neuroscience approaches. In J. A. Griffin, P. McCardle, & L. S. Freund (Eds.), *Executive function in preschool-age children: Integrating measurement, neurodevelopment, and translational research*. (pp. 259–278). American Psychological Association. <https://doi.org/10.1037/14797-012>
- Lawson, G. M., & Farah, M. J. (2017). Executive function as a mediator between SES and academic achievement throughout childhood. *International Journal of Behavioral Development*, 41(1), 94-104. <https://doi.org/10.1177/0165025415603489>

- Lorenzo-Seva, U., Ferrando, P. J., & Chico, E. (2010). Two SPSS programs for interpreting multiple regression results. *Behavior Research Methods*, *42*(1), 29-35. <https://doi.org/10.3758/brm.42.1.29>
- Mann, T. D., Hund, A. M., Hesson-McInnis, M. S., & Roman, Z. J. (2017). Pathways to school readiness: Executive functioning predicts academic and social-emotional aspects of school readiness. *Mind, Brain, and Education*, *11*(1), 21–31. Portico. <https://doi.org/10.1111/mbe.12134>
- Memisevic, H., & Biscevic, I. (2018). Exploring the link between inhibitory control and cognitive flexibility in preschool children. *Cognition, Brain, Behavior*, *22*(1), 1–11. <https://doi-org.ezp.waldenulibrary.org/10.24193/cbb.2018.22.01>
- Metaferia, B. K., Futo, J., & Takacs, Z. K. (2021). Parents' views on play and the goal of early childhood education in relation to children's home activity and executive functions: A cross-cultural investigation. *Frontiers in Psychology*, *12*. <https://doi.org/10.3389/fpsyg.2021.646074>
- Miller, E. K., Lundqvist, M., & Bastos, A. M. (2018). Working Memory 2.0. *Neuron*, *100*(2), 463–475. <https://doi.org/10.1016/j.neuron.2018.09.023>
- Mistry, R. S., Brown, C. S., White, E. S., Chow, K. A., & Gillen-O'Neel, C. (2015). Elementary school children's reasoning about social class: A mixed-methods study. *Child Development*, *86*(5), 1653-1671. <https://doi.org/10.1111/cdev.12407>
- Moran, K. M., Turiano, N. A., & Gentzler, A. L. (2018). Parental warmth during childhood predicts coping and well-being in adulthood. *Journal of Family Psychology*, *32*(5), 610. <https://doi.org/10.1037/fam0000401.supp>

- Morgan, P. L., Farkas, G., Wang, Y., Hillemeier, M. M., Oh, Y., & Maczuga, S. (2019). Executive function deficits in kindergarten predict repeated academic difficulties across elementary school. *Early Childhood Research Quarterly, 46*, 20-32. <https://doi.org/10.1016/j.ecresq.2018.06.009>
- National Center for Education Statistics. (2012). *Improving the measurement of socioeconomic status for the national assessment of educational progress: A theoretical foundation*—Recommendations to the National Center for Education Statistics. <https://files.eric.ed.gov/fulltext/ED542101.pdf>
- Navarro-Carrillo, G., Alonso-Ferres, M., Moya, M., & Valor-Segura, I. (2020). Socioeconomic status and psychological well-being: Revisiting the role of subjective socioeconomic status. *Frontiers in Psychology, 11*. <https://doi.org/10.3389/fpsyg.2020.01303>
- Nesbitt, K. T., Baker-Ward, L., & Willoughby, M. T. (2013). Executive function mediates socioeconomic and racial differences in early academic achievement. *Early Childhood Research Quarterly, 28*(4), 774-783. <https://doi:10.1016/j.ecresq.2013.07.005>
- Noble, K. G., Houston, S. M., Brito, N. H., Bartsch, H., Kan, E., Kuperman, J. M., Akshoomoff, N., Amaral, D. G., Bloss, C. S., Libiger, O., Schork, N. J., Murray, S. S., Casey, B. J., Chang, L., Ernst, T. M., Fraizer, J. A., Gruen, J. R., Kennedy, D. N., Van, Zijl, P., Jernigan, T., Sowell, E. R. (2015). Family income, parental education, and brain structure in children and adolescents. *Nature Neuroscience, 18*(5), 773–778. <https://doi:10.1038/nn.3983>

- Nowak, A. L., Braungart, R. J. M., & Planalp, E. M. (2020). Children's dysregulated representations mediate ineffective parenting practices and effortful control in lower-income families. *Family Relations: An Interdisciplinary Journal of Applied Family Studies*, 69(4), 698–713. <https://doi.org/10.1111/fare.12463>
- Ogg, J., & Anthony, C. J. (2020). Process and context: Longitudinal effects of the interactions between parental involvement, parental warmth, and SES on academic achievement. *Journal of School Psychology*, 78, 96–114. <https://doi.org/10.1016/j.jsp.2019.11.004>
- Pino-Pasternak, D., & Whitebread, D. (2010). The role of parenting in children's self-regulated learning. *Educational Research Review*, 5(3), 220–242. <https://doi.org/10.1016/j.edurev.2010.07.001>
- Puccioni, J. (2014). Parents' conceptions of school readiness, transition practices, and children's academic achievement trajectories. *The Journal of Educational Research*, 108(2), 130-147. <https://doi:10.1080/00220671.2013.850399>
- Rahardja, U., Aini, Q., Graha, Y. I., & Lutfiani, N. (2019). Validity of test instruments. *Journal of Physics: Conference Series*, 1364, (1), 1. <https://doi.org/10.1088/1742-6596/1364/1/012050>
- Ready, D. D., & Reid, J. L. (2019). Children's executive function development and school socioeconomic and racial/ethnic composition. *Early Childhood Research Quarterly*, 47, 457-471.
- Robinson, C. C., Mandelco, B., Olsen, S. F., & Hart, C. H. (2001). The parenting styles and dimensions questionnaire (PSQD). In B. F. Perlmutter, J. Touliatos & G. W.

Holden (Eds.), *Handbook of family measurement techniques*, 3. Instruments & Index (pp.319-321). Sage.

Roos, L. E., Beauchamp, K. G., Flannery, J., & Fisher, P. A. (2017). Cultural contributions to childhood executive function. *Journal of Cognition and Culture*, 8, 61.

Sarsour, K., Sheridan, M., Jutte, D., Nuru-Jeter, A., Hinshaw, S., & Boyce, W. T. (2011). Family socioeconomic status and child executive functions: The roles of language, home environment, and single parenthood. *Journal of the International Neuropsychological Society*, 17(1), 120–132.

<https://doi.org/10.1017/S1355617710001335>

Sasser, T. R., Bierman, K. L., Heinrichs, B., & Nix, R. L. (2017). Preschool intervention can promote sustained growth in the executive function skills of children exhibiting early deficits. *Psychological Science*, 28(12), 1719-1730.

<https://doi.org/10.1177/0956797617711640>

Sharkins, K. A., Leger, S. E., & Ernest, J. M. (2017). Examining effects of poverty, maternal depression, and children's self-regulation abilities on the development of language and cognition in early childhood: An early head start perspective. *Early Childhood Education Journal*, 45(4), 493–498. [https://doi.org/10.1007/s10643-](https://doi.org/10.1007/s10643-016-0787-9)

[016-0787-9](https://doi.org/10.1007/s10643-016-0787-9)

Shrive, F. M., Stuart, H., Quan, H., & Ghali, W. A. (2006). Dealing with missing data in a multi-question depression scale: A comparison of imputation methods. *BMC*

*Medical Research Methodology*, 6, Article 57. <https://doi.org/10.1186/1471-2288->



6-57

- Sorkhabi, N., & Mandara, J. (2013). Are the effects of Baumrind's parenting styles culturally specific or culturally equivalent? In *Authoritative parenting: Synthesizing nurturance and discipline for optimal child development*. (pp. 113–135). American Psychological Association. <https://doi.org/10.1037/13948-006>
- Sosic-Vasic, Z., Kröner, J., Schneider, S., Vasic, N., Spitzer, M., & Streb, J. (2017). The association between parenting behavior and executive functioning in children and young adolescents. *Frontiers in Psychology*, 8(42). <https://doi.org/10.3389/fpsyg.2017.00472>
- Stacy, R. N. (2022). Hawthorne Effect. *Salem Press Encyclopedia*.
- Stangor, C. (2015). *Research methods for the behavioral sciences* (5th ed.). Cengage Learning.
- Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin*, 87(2), 245-251. <https://doi.org/10.1037/0033-2909.87.2.245>
- Svedberg, P., Nygren, J. M., Staland-Nyman, C., & Nyholm, M. (2016). The validity of socioeconomic status measures among adolescents based on self-reported information about parents' occupations, FAS and perceived SES: Implication for health-related quality of life studies. *BMC Medical Research Methodology*, 16(1). <https://doi.org/10.1186/s12874-016-0148-9>
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Pearson.
- Tan, J. J. X., Kraus, M. W., Carpenter, N. C., & Adler, N. E. (2020). The association between objective and subjective socioeconomic status and subjective well-being:

A meta-analytic review. *Psychological Bulletin*, 146(11), 970–1020.

<https://doi.org/10.1037/bul0000258>

Theresya, J., Latifah, M., & Hernawati, N. (2018). The effect of parenting style, self-efficacy, and self-regulated learning on adolescents' academic achievement. *Journal of Child Development Studies*, 3(1), 28-43.

Thorell, L. B., & Nyberg, L. (2008a). The childhood executive functioning inventory (CHEXI): A new rating instrument for parents and teachers. *Developmental Neuropsychology*, 33(4), 536-552. <https://doi.org/10.1080/87565640802101516>

Thorell, L. B., & Nyberg, L. (2008b). *Childhood executive functioning inventory* [Database record]. <https://dx.doi.org/10.1037/t62232-000>

Ursache, A., & Noble, K. G. (2016). Neurocognitive development in socioeconomic context: Multiple mechanisms and implications for measuring socioeconomic status. *Psychophysiology*, 53(1), 71–82. <https://doi.org/10.1111/psyp.12547>

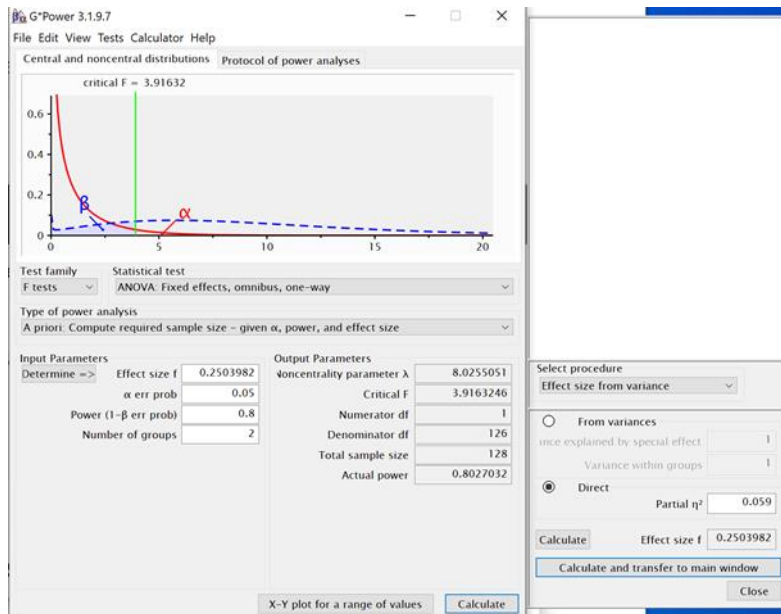
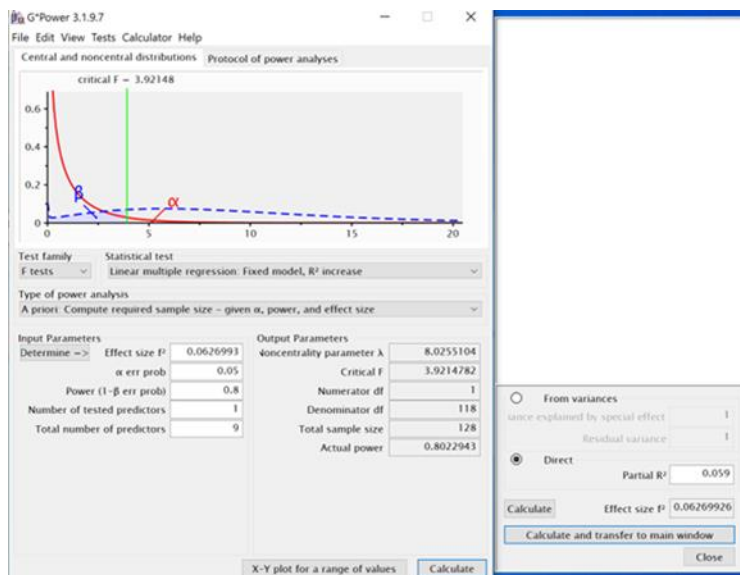
Veer, I. M., Luyten, H., Mulder, H., van Tuijl, C., & Slegers, P. J. (2017). Selective attention relates to the development of executive functions in 2, 5-to 3-year-olds: A longitudinal study. *Early Childhood Research Quarterly*, 41, 84-94. <https://doi.org/10.1016/j.ecresq.2017.06.005>

Votruba, D. E., Miller, P., & Coley, R. L. (2016). Poverty, urbanicity, and children's development of early academic skills. *Child Development Perspectives*, 10(1), 3–9. <https://doi.org/10.1111/cdep.12152>

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press

- Walden University. (2023). Retrieved from <https://academics.waldenu.edu/handbook/vision-mission-goals#s-lg-box-30141422>
- Wang, Z., & Dong, S. (2019). Autonomy as core of creativity and compliance: moderated moderation model of maternal parenting behaviors. *Creativity Research Journal*, 31(1), 74-82. <https://doi.org/10.1080/10400419.2019.1577674>
- Wang, J., Chen, C., & Gong, X. (2021). The impact of family socioeconomic status and parenting styles on children's academic trajectories: A longitudinal study comparing migrant and urban children in China. *New Directions for Child and Adolescent Development*, 2021(176), 81-102. <https://doi.org/10.1002/cad.20394>
- Warner, R. M. (2013). Applied statistics: From bivariate through multivariate techniques (2nd ed.). Sage Publications, Inc.
- Willoughby, M. T., Magnus, B., Vernon-Feagans, L., & Blair, C. B., (2017). Developmental delays in executive function from 3 to 5 years of age predict kindergarten academic readiness. *Journal of Learning Disabilities*, 50(4), 359–372. <https://doi.org/10.1177/0022219415619754>
- Wulfert, E. (2019). Social learning, according to Albert Bandura. Salem Press Encyclopedia of Health.
- Zelazo, P. D., Blair, C. B., Willoughby, M. T., & National Center for Education Research (ED), & Westat, I. (2016). Executive function: implications for education. NCER 2017-200.

## Appendix A: Power Analysis for Target Sample Size



Appendix B: Parenting Styles and Dimensions Questionnaire Permission

PERMISSION TO USE: Parenting Styles and Dimensions Questionnaire (PSDQ)-Short Version)

2/2/2022

Good evening, Dr. Hart:

My name is Kimberly Barrow, and I was referred to you by Dr. Holmes. I am a doctoral student at Walden University, completing my dissertation in Educational Psychology. My dissertation topic is “Executive Functioning of Kindergarteners as Predicted by Parenting Style, Parental Warmth, and Parents’ Socioeconomic Status”. I am writing you because I would like your help finding out who I need to contact to get permission to use The Parenting Styles & Dimension Questionnaire (PSDQ-Short Version) in my dissertation. I saw that Dr. Robinson is retired; so, I’m unsure if he is still the contact person or someone else. Any guidance on who to contact or what I should do would be greatly appreciated.

I look forward to hearing from you soon.

Sincerely,

Kimberly Barrow

From: Craig H.

Date: 2/2/2022 9:55 p.m.

Dear Kimberly,

You are welcome to use the Parenting Styles and Dimensions Questionnaire (PSDQ) in your research. Attached are some additional resources for the parenting constructs we have measured that might be useful, including a 2003 chapter that provides the conceptual foundation for the PSDQ that might be helpful for interpretation. How to calculate parenting style dimensions depends on what type of analysis is being conducted (e.g., SEM procedures or traditional statistics).

Attached are documents showing which items typically go together for each parenting style dimension for the 32-item and 62-item versions of the PSDQ. An additional reference for the 62-item PSDQ is pasted below. The 32-item version contains items that appear to work well based on analyses that we have conducted. There is another 26-item version that seems to work well with Chinese samples (see Wu et al. 2002 attached). The permissiveness scale is eliminated from the Wu et al. 2002 version because permissiveness items do not appear to work as well in Asian cultures. It is uncertain which of the PSDQ measure versions noted above will work best for your sample. You will also find measures for psychological control parenting dimensions that appear in our published work attached.

Robinson, C. C., Mandleco, B., Olsen, S. F., & Hart, C. H. (2001). The parenting styles and dimensions questionnaire (PSDQ). In B. F. Perlmutter, J. Touliatos, G. W. Holden (Eds.), *Handbook of family measurement techniques: 3. Instruments & index* (pp. 319 - 321). Sage

We have also used the PSDQ, along with other parenting measures, as item banks to draw from in adapting measures for addressing specific hypotheses. Attached are several

sample articles where we have done so that might be of interest to you. You can also go to my Google Scholar page to see how others are using versions of the PSDQ in their research and where it has already been translated for use in other cultures. Keep in mind that the PSDQ was developed for parents of young children. However, some scholars have found it useful for research with adolescents.

<https://scholar.google.com/citations?user=KifSD6gAAAAJ&hl=en&oi=ao>

I hope that this information about the PSDQ is helpful.

Sincerely,

**Craig H. Hart, Ph.D.**

Director, BYU Faculty Center

Zina Young Williams Card Professor of Human Development

School of Family Life

Appendix C: Childhood Executive Functioning Inventory Permission

PERMISSION TO USE: Childhood Executive Functioning Inventory (CHEXI)

2/7/2022

My name is Kimberly Barrow, and I am a doctoral student at Walden University, completing my dissertation in Educational Psychology. My dissertation topic is “Executive Functioning of Kindergarteners as Predicted by Parenting Style, Parental Warmth, and Parents’ Socioeconomic Status.” Under the direction of my committee chair Dr. Diebold, I would like your permission to use and reproduce the Childhood Executive Functioning Inventory under the following conditions:

I will use this survey only for my research study and will not sell or use it with any compensation or curriculum development activities.

I will include the copyright statement on all copies of the instrument.

I will send a copy of my completed research study to you upon completion of the study.

I will be using this instrument in an online format.

If these are acceptable terms and conditions, please indicate so by responding to this email.

Sincerely,

Kimberly Barrow

From: Lisa T.

Date 2/7/2022 4:37 a.m.

Dear Kimberly,



Thanks for your email. It sounds like an interesting study, and you have my permission to use and reproduce the CHEXI per the description in your email below (i.e., use only for your research study and not sell or use it with any compensated or curriculum development activities). Online format is OK.

Good luck with your study!

Best regards,

Lisa Thorell

Lisa B Thorell

Associate Professor

Division of Psychology

Department of Clinical Neuroscience

Karolinska Institutet

**Demographic Items**

1. Please indicate your sex checking your response:
  - a. Male
  - b. Female
2. Please indicate your age in years: \_\_\_\_\_
3. Please indicate the category that best describes your race/ethnicity:
  - a. White non-Hispanic
  - b. Black or African American non-Hispanic
  - c. Hispanic or Latinx
  - d. American Indian or Alaska Native
  - e. Asian
  - f. Native Hawaiian or other Pacific Islander
  - g. Two or more races/ethnicities
4. How many years of schooling have you completed?
  - a. Elementary/middle school = 1-8 years
  - b. High school or GED = 12 years
  - c. Community college = 14 years
  - d. College/university = 16 years
  - e. Graduate school = 17-20+ years

Please indicate the category that best describes your total annual household income:

- a. Less than \$5,000
- b. 5,000–7,499
- c. 7,500–9,999
- d. 10,000–12,499
- e. 12,500–14,999
- f. 15,000–19,999
- g. 20,000–24,999
- h. 25,000–29,999
- i. 30,000–34,999
- j. 35,000–39,999
- k. 40,000–49,999
- l. 50,000–59,999
- m. 60,000–74,999
- n. 75,000–99,999
- o. 100,000–149,999
- p. 150,000 or more